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GAS LIGHT JOURNAL

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BRIEFLY TOLD.

AFTER-THOUGHTS TRACING TO THE ZANESVILLE MEETING.—The bubble and glitter and bustle of the Zanesville gathering of the Ohio Association having spent its buoyancy, been dimmed by the tarnish of time, and tamed by the realization of other and present duties, it looks as if profit could not be extracted now by again glancing over the field through which its exercises led. Presuming that "Three Stars" last week gave a sufficiently lengthy and accurate account of what was done at Zanesville, in respect to the non-technical side of the meeting, we will not make any further comment thereon save to remark that the exhibition of gas appliances was well worthy of the attention of the members. Possibly another party who ought to feel comfortably over the exhibition and its teachings is the Zanesville Gas Light Company, whose proprietors must reap great pecuniary benefit from the awakening of the residents to what can be done with gas for cooking purposes. It also taught most convincingly the good policy of gas companies maintaining a wareroom, of the showy order, on a prominent business street, wherein to display apparatus incident to the consumption of gas. This we deem would be a most profitable operation for even the smaller companies. It would not be necessary to keep such a room or shop open the year round in the smaller localities; for the purpose would be pretty well served were the display maintained, say, during the spring months—possibly trying it again in September and October. The expense and trouble incident to the trial would be far more than recouped by the profit from the gas sales, and that profit could be counted on for years. Of course, the majority of the larger companies follow this practice now, and our only object in thus speaking is to enlist the smaller—the very small companies, in fact—to do likewise. There is no risk about it; the profit is certain.

Very tasteful displays were made at Zanesville by the Chicago Gas Stove Company, George M. Clark & Co., the Maryland Meter Company, the American Meter Company—the latter's collection, however, was more select than numerous—the American Tubing Company, and others; and the Zanesville Gas Company is entitled to all praise for the way in which the arrangements were planned and carried out.

Having taken our leave of this side of the meeting, we come to a consideration of some of the matters discussed by Mr. Faben, in his matter-of-fact inaugural address. The Toledo man is nothing if not broad-minded, logical and outspoken. The JOURNAL has preached for years sermons in season and out-of-season respecting the value to the gas proprietors of having their engineers and superintendents attend these sessions. Value, we mean, in money to them—the former. And yet it is the fact that some of the money-bags—few they are, however, to the credit of the industry be it said—not only refuse to pay the traveling expenses of their engineers in attending the sessions, but insist that his time shall not be wasted (!) even at his own expense! Mr. Faben puts it very plainly in his fifth paragraph; and co incidently we may mention that our English correspondent (Mr. Humphreys), in his letter for this month (pp. 442-3) also makes some pointed remarks on this very subject. He finds there, as we do here, that "the best and foremost undertakings in the country are under the care of those who take a prominent interest in our gas manager's Associations, who not only pay their guinea, but are always present at the meetings, and are frequent contributors of

papers and participants in the discussion. The converse is also true. The undertakings that appear frequently before the public, on account of bad gas, high prices, exorbitant profits, or other financial mismanagement, are just the ones whose directors are noted for the policy of keeping within their shells, and who would, if they could, stop their manager's salary for the time spent in attending an Association meeting." This and that, by Humphreys and Faben, go to show that the cent-wise and dollar-foolish are alike, whether in England or America, and their punishment is the same. Unfortunately, however, the latter is sometimes slow in coming.

We confess to surprise at Mr. Faben's remarks concerning the opinion held by him as to the attitude that should be held by the Association towards the agitation favoring the municipal control of gas and electric lighting plants. If the conjoint opinion of the Association, openly expressed, would result in advancing rather than retarding the aims of those who believe that governmental protection is the panacea for all our ills, then the penny-wise director might have some excuse for his opinion that our Associations were not all their advocates painted them. No, we must hold to the contrary with Mr. Faben there. United expression from those who know whereof they speak might create friction, but the force generated thereby could not harm the utterers thereof—those against whom it was directed must be the sufferers. From our way of looking at this odd matter, however, we cannot perceive wherein the paternal industrial government advocates have made progress of late. Their pretty mouthings seemed at first to make converts, but converts are at best uncertain birds, whose flight, always erratic, is never over-strong. And the signs appear to indicate that the song of the Rosewaters, the Elys and the rest of that feather, is not so thrilling as it was. We have an abiding faith in the ruggedness of the American public, who will finally be positive in refusing to hand over to plundering political control that which rightfully belongs to the custody of clean-handed private enterprise. Mr. Faben is as cool as ever over the outlook for a so-called distinctive fuel gas, and his remarks regarding electric power, as opposed to gas engine power, are well-timed and full of meaning. We hope with him that our Associations will see to it that their efforts in connection with the gas exhibits at the coming World's Fair are well directed and continuous. The gas men cannot afford to be negligent in this instance, if the world is to know that their product is to retain its supremacy in the lighting field. Mr. Faben, as said before, put himself on record in no doubtful way, in respect to the questions discussed in the address, and it is a pleasure to add that his direction of the meeting was equally firm.

THE authorities of Rockville, Conn., have made an agreement with the local Gas and Electric Light Company respecting the public lighting for the ensuing year. According to the contract, the Company is to maintain 74 arc lamps (1,200-candle power) from dusk until midnight, on 300 nights in each year, at the rate of $75 per lamp per annum. The city is to receive a rebate of 4½ cents per light per hour, when the lamps fail to burn during contract hours.

THE proprietors of the Great Barrington (Mass.) Gas Light Company have petitioned the Legislature for authority to sell that property to the local electric light company.

AT the annual meeting of the Bay State (Boston, Mass.) Gas Company, held in Wilmington, Del., about 10 days ago, the following officers were elected: Directors, Messrs. Frank K. Hipple and Henry C. Gibson, of Philadelphia, and J. Edward Addicks, of Boston; President and Treasurer, J. Edward Addicks; Vice-President, Henry C. Gibson.

IT is the prevailing impression in Richmond, Va., that the gas rate there will speedily be reduced to $1.25 per 1,000. Although such action will, basing the estimate on the total receipts for last year, on its face reduce the city's revenue from gas sales by some $32,000, it is urged on the other hand, that the gross receipts, because of increased demand at the lower rate, will show no shrinkage.

[Prepared for the JOURNAL.]

Where Does Light Go?

By COL. J. A. PRICE.

A significant suggestion is made in your comment upon Professor Forbes' experiments with frosted bulbs or ground glass and the transmission of light, in your issue of 16th inst., when it is inquiringly stated, 'Now, the interesting and scientific part of the question would be to discover where light does go."

The question put where a transparent surface has been made translucent, as in the case of a cut, frosted or ground surface given to glass, is applicable to light generally. Where does light go? What becomes of the darting, shooting, piercing ray? These questions are equally to the point, whether we accept the theory of emission or of undulation, but particularly as to the latter.

To obtain as full a comprehension of the simple object as possible, let us, for the moment, consider that the expression of movement of light is in a right line—a right line only. This is an effect on the senses which we may say we know practically. Undisturbed, so far as we can calculate, the movement will go on indefinitely and forever; but when disturbed, we call the manifestation deflection (bent as to course), refraction (broken as to course, or a violent *deflection*), and reflection (doubled back as to course, or the most violent action to which light is susceptible).

Now, if we imagine light to be a solid bar, we will observe, on the basis of what is here advanced, that it might perform all the movements that we are ascribing to a single ray of light, and, if properly projected, as light is, it might go on indefinitely, bending, coiling and twisting through all creation. But we always conceive the idea of light by multiples—we speak of *a* ray when we really mean *a whole bundle* of rays; how many it is ever impossible to enumerate. So, continuing the figure of the bar, let us fill our horizon with an infinite quantity of bars, projected from an ever-lasting and ever-moving force, as they go on bending, coiling and twisting, until the sphere of our surrounding is filled and bar meets bar, each with the projection of the other, derived from the same imperial source, and propelled by the same majestic energy. Where do the bars go? On the light principle they cease to be bars, as light ceases to be light when *motion* becomes *rest*. With no means of progress or continuance except upon each other, we have come to the inevitable halt of the senses over the conception of an irresistible force and an indestructible body; for bar thus circumstanced cannot displace bar, and with the cessation of action the bars are no more on the principle of light. It is the Greek of nature meeting Greek with the natural product of Nihilism after action. In this way light *is said to be decomposed*.

The same analogy may be carried into our conception of sound, where two identical vibrations neutralize each other and produce silence; and the same with air—the same with water.

Then may we not account for the loss of light as exhibited by the photometer in transmission, through a mass of prisms and reflecting surfaces, of the ground glass or the frosted globe, as perfectly natural? For, in the passage, ray has met ray and become extinct. This warfare is eternal—it is going on everywhere. Otherwise the universe would be all light, and primal sources would in no way be needed to combat the everlasting tendency to what is darkness to the senses.

Thus then we may reasonably conclude that the loss which we experience in tranmission of light is simply a constant tendency of one ray to kill another as nothing else can, and as the prisms and surfaces are multplied the loss is increased, and vice versa. Such at least appears to be the law of the elements that are inherent in matter and of a primary character.

The Market for Gas Securities.

The Exchanges are closed to-day (Good Friday), and so far as the volume of business transacted was concerned, the money marts might as well have remained unopened for the week. Consolidated sold up to 96 in the interim of our last, and the closing price on Thursday was 95½ bid, offered at 97. The feeling seemed to be in the line of higher prices, but the transfers are so ridiculously small as to afford no line whereon to base a prediction. Our faith in the shares, however, is as strong as ever, and the pronounced rise that we confidently look for cannot be much longer delayed. Mutual is in demand, at a further advance in the bid price, and Equitable shows no change.

Brooklyn shares are steady and strong, and it is reported that the project for a consolidation on a grand scale is rapidly taking on shape. Chicago gas moved up sharply on purchases that were claimed to be largely on account of insiders, aided by the rumor that when a legal reorganization has been affected, a sum equal to the rate of 4 per cent. per annum will be distributed among the shareholders on account of "suspended dividends." Bay State gas shows no change, but the demand is slight. Laclede is unchanged, although some inquiry for the preferred caused holders to advance their figures. Baltimore Consolidated is a trifle stronger, and holders are beginning to speak about the possibility of a dividend this year. The Cincinnati Company has declared its usual dividend. The whole market suffers from stagnation, but the situation from an investor's standpoint is eminently satisfactory.

[Official Report.—Revised by the Secretary.]

SEVENTH ANNUAL MEETING OF THE OHIO GAS LIGHT ASSOCIATION.

Held at Zanesville, March 18 and 19, 1891.

First Day—Morning Session.

The seventh annual meeting of the Ohio Gas Light Association opened at Zanesville, Wednesday, March 18, 1891, at 9:30 A.M., the President, Charles R. Faben, Jr., in the Chair. The minutes of the last meeting having been published, the reading was dispensed with.

The President—The first business in order will be the reports of the committees, and of the Secretary and the Treasurer. The report of the Executive Committee will be read by the Secretary.

Report of Executive Committee.

The Secretary—Pursuant to instructions received from the Association at its last meeting I sent the following circular to each member:

"Dear Sir: At the recent meeting of the Ohio Gas Light Association, at Toledo, Ohio, the Secretary was instructed to ascertain the views of each member as to the adoption of a badge, more or less similar to those that have been adopted by the other Associations, and for the same purpose—viz., for the members to wear at the annual meetings and on other appropriate occasions.

"Will you please fill in the blanks below and return this to me at your earliest convenience?"

In the circular I asked three questions: (1) Are you in favor of the adoption of such a badge by the Ohio Gas Light Association? (2) Should the badge be furnished to the members and paid for by the Association; or should each member who desires one pay for his own badge? (3) About what should be the cost of such a badge? The vote in favor of the adoption of a badge stands 107 to 12; that each member should pay for his own badge, 69 to 39; while the cost of the badge is fixed at $3 by the majority of those voting. The Committee recommend that a committee of three be appointed by the Chair to select a badge, to ascertain the number of members desiring one, and to provide and furnish badges to such members, together with a sufficient surplus to supply new members who may come in hereafter. The second recommendation of the Committee is that the written withdrawals from membership by the following members (for the reason that they are no longer in the gas business) be accepted: W. T. Bowers, Hillsboro; R. Turner, Salem; F. F. Remple, Jr., Logan; T. C. Jones, Delaware; E. H. Crane, Niles: F. Fabing, Fremont. The third recommendation is that the following members be dropped for delinquency in the payment of dues: Richard Salter, Covington, Ky.; John Devor, Greenville, Ohio. The Committee's fourth recommendation is that the Association elect to honorary membership Forrest E. Barker, a member of the Massachusetts Gas Commission.

The report of the Committee was adopted as a whole.

The President—As Mr. Barker is present with us, we would like to hear from him; and I take much pleasure in introducing him to this body.

Mr. Barker—Mr. President and Gentlemen: This is indeed a surprise to me—a very pleasant, but also somewhat an embarrassing one. I assure you I appreciate the very cordial greeting that I have received at the hands of those members of the Association whom it was my good fortune to know before I came here, and also from those whom I have had the pleasure of meeting since my arrival. I assure you, also, that I sincerely appreciate the honor you have been pleased to do me by electing me to honorary membership in this Association. I am sure it is a compliment which no one who has any connection whatever with the business in which you are engaged would decline. I wish to congratulate you, Mr. President, the officers of the Association, and the Association itself, upon the very good attendance which is here; and I trust that you will have a very pleasant and a very profitable meeting. I was attracted here largely by the reputation of the Ohio Association, and by the practical and very interesting topics which have been announced for discussion. I know you are all interested in them and are anxious to deal with them, and as I also am very desirous to hear them dealt with, I will not take up any more of your time. I do desire to thank you again, and most heartily, for the honor you have conferred upon me, and I trust that I shall have the pleasure of making the acquaintance of a very large number of the members individually.

Committee on Badges.—The President appointed the following Committee on Badges: M. A. Gemuender, J. W. R. Cline, and G. A. Hyde.

Committee on Applications for Membership.—Also the following Committee on Applications for Membership: W. W. Cantine, L. A. Strong, and George H. Tayler.

Report of Secretary.

The Secretary read the following report:

In hands of Secretary at beginning of year		$136 00
Received as dues and initiation fees		451 00
Total credits		$587 00
Remitted to Treasurer, Mar. 25, 1890	$175 00	
" " May 6, 1891	175 00	
" " Mar. 16, 1891	159 00	
Total debits		509 00
Balance in hands of Secretary		$78 00
Dues for 1889 still unpaid	$33 00	
" 1890 "	84 00	
" 1891 "	261 00	
Total dues unpaid		$378 00
New members admitted at last meeting		33
Released from membership at last meeting		9
Elected from active to honorary membership		1
Present number of active members		151
Present number of honorary members		9
Number of active members deceased during year		0
Number of honorary members deceased during year		1

Respectfully submitted, Irvin Butterworth, Sec.

Upon motion the report was accepted.

Report of Treasurer.

Mr. McCook read the following report as Treasurer, which was, on motion, accepted:

Receipts.

1890. Mar. 26.	H. Wilkiemeyer, Ex-Treasurer		$1,028 99
" 27.	Irvin Butterworth, Secretary		175 00
May 13.	" "		175 00
1891. Mar. 17.	" "		159 00
	Interest on $600.00, 10 months, 5 per cent.		25 00
	Total receipts		$1,562 99

Disbursements.

1890. April 15.	Irvin Butterworth, salary	$200 00	
	" expenses	59 93	
	Ohio State Journal Company, printing	87 75	
	Mansfield Gas Light Company, expenses 5th annual meeting	76 42	
	W. C. Hedges, postage	6 24	
	Geo. A. Halm, printing	48 50	
	Edw. Lindsley, printing	11 00	
May 13.	" " expenses	6 50	
	Toledo Gas Light Company, expenses of 6th annual meeting	155 19	
1891. Mar. 17.	Exchange on N. Y. draft	90	
	Total disbursements		$652 43
	Balance in hands of Treasurer		$910.56

Respectfully submitted,
George W. McCook, Treasurer.

Election of New Members.

Mr. Cantine—The Committee on Applications of New Members are ready to report. They present the names of Geo. H. Phillip, Supt. City Gas Works, Hamilton, O.; H. D. Timmons, Supt. Barnesville (O.) Gas and Electric Light Company; V. H. Harris, Supt. Fostoria (O.) Light and Power Company; Frederick H. Shelton, Gas Engineer, United Gas Improvement Company, Phila. Pa.; Henry M. Hubbard, Sec. George M. Clark Stove Company, Chicago, Ills.; W. G. Bissell, with the same Company; Wm. S. Essick, Prest. Keystone Meter Company, Royersford, Pa.; and Sterling F. Hayward, Treas. Connelly Iron Sponge and Governor Company, New York city—all being gentlemen of the first order, and proper persons for election to membership in this Association.

On motion, the Secretary was directed to cast the ballot of the Association for the election of the gentlemen named. The President introduced and welcomed the new members.

ROLL CALL.

The Secretary called the roll, which disclosed the presence of the following members:

Honorary Members.

Jos. R. Thomas, J. P. Harbison, Geo. W. Graeff, Jr.

Active Members.

Adams, C. F.	Hammond, A. N.	Penn, Jerome.
Allen, G. A.	Harris, J. A.	Persons, F. R.
Bate, Jos. M.	Hedges, J. S.	Prichard, W. W.
Booth, Miller.	Hurlburt, H. L.	Printz, Eugene.
Butterworth, Irvin.	Lathrop, A. P.	Roots, D. T.
Canby, R. H.	Ley, W. S.	Russell, E. M.
Cantine, W. W.	Light, Geo.	Sherrard, R., Jr.
Christian, G. H.	McCall, Hugh.	Sisson, F. N.
Clapp, G. N.	McCook, Geo. W.	Skinner, J. W.
Cline, J. W. R.	McIlhenny, John.	Smith, J. H.
Dell, John.	McMillin, M.	Stephens, J. G.
Dickey, C. H.	Matt, Geo.	Strong, L. A.
Douglas, H. W.	Marden, C. A.	Tayler, G. H.
Faben, C. R., Jr.	Mills, John.	Welch, C. H.
Faux, J. A.	Nash, A. F.	Wilkiemeyer, H.
Gwynn, J. W.	Otius, Geo.	

PRESIDENT'S ADDRESS.

The President then read the following address:

Gentlemen of the Ohio Gas Light Association:

Again are we assembled in convention for the purpose of conferring with each other upon the various points of interest pertaining to the business that we represent. Our membership is composed of individuals from all parts of the State, together with many from our sister States, and among the same are enrolled individuals who represent gas light companies, in the various offices and capacities, from that of President, down through the various positions to that of, I might say, the most humble "hired man."

Surely, in such a gathering, a large fund of valuable material is brought into close contact, and much good ought properly be the result of such a meeting, no matter what the nature of the question be, that seems at the time to interest each individual most.

If the question presented happens to be upon the subject of a particular line of policy or business practice, we have among our number those who are eminently well qualified to disscuss such matters, or if the question be one of what constitutes good practice in the manufacture and distribution of our product, then we have present with us those who are equally well qualified to discuss this particular feature of the gas business proper; hence, I say, there is no good reason why these yearly gatherings should not be almost directly profitable to all who participate in them.

It is hardly proper for me to occupy your time and attention with any sort of argument, but I feel constrained to point out some of the features of our Association meetings as I comprehend them, and for particular reasons.

It has been stated by some that to read over the published proceedings of our meetings is sufficient, and quite as beneficial as though the time and expense of attendance at the meeting had been resorted to. This I believe to be a great error. Who of us but have oftentimes communicated to others in private conversation matters of interest and importance, private in their nature, that we could not consistently communicate, if the same was to become public property, as it would become were it to appear in the published reports of our proceedings?

The literary part of the programme of our meetings I think is differently understood by different persons, and this difference of understanding does perhaps in a large measure account for the stubborn unwillingness on the part of the majority of our members to consent, under any circumstances, to contribute a paper to be read and discussed before the meeting. This action on the part of the members is entirely wrong, and results in making the work of our Secretary extremely arduous, and were he less zealous and persistent in the work of securing contribution to the literary part of our programme, that feature of our yearly meetings would be extremely tame. Then, again, since so many do refuse to contribute a paper, they seem to hesitate in a like manner to participate in the discussions that should properly be provoked by the reading of many of the papers that are presented.

To my mind, the general principles involved in the gas industry are well understood and distributed, and in asking a member to present a paper to be read and discussed, it is not expected of him that the paper so presented will amount to a "revelation." We are met simply as the employees of capital invested in the gas industry, and some portion or detail of this investment is intrusted to our individual care; and to the end that we may avoid some of the mistakes that others have made, we have come together to hold an "experience meeting," and, therefore, our expressions should be full, free and complete, so that the purpose for which we have come together may be speedily accomplished.

We are not a scientific society, nor are we investigators, who labor to find new forces and factors; we are simply, as before stated, the active workers for the various gas light companies that we here individually represent, and the details that we pratice in our business and have found to be correct in operation—that is the material brought together here today, and only by a full, and free expression can we turn this valuable material to proper account, and accomplish the full purpose for which we are met.

The proper committee of our Association met and selected a number of subjects, that, in their opinion, would prove most interesting at this time. To a few of them, the Secretary has succeeded in obtaining authors to write upon the subject assigned. It is unnecessary for me to make extended reference to the subjects that will be presented for your consideration. That the presentation will be made in a strong manner there is no room to doubt.

In regard to the work accomplished by the Association during the past year there is little to report upon, aside from the reports that have been rendered by the several committees to whom such work has been assigned.

The past year has not been prolific in the production of new processes, nor have the many recognized processes, methods and practices experienced serious changes, or improvements, but there has been a general improvement in many directions, and the points of merit presented in the different processes and methods are better understood and appreciated. Much of our former prejudices have been dismissed, and we are no longer known among ourselves as being strictly coal gas or strictly water gas men, but rather as modern, progressive gas manufacturers.

The general condition of the gas industry at the present time is certainly encouraging. Realizing and appreciating the inroads that have been made, and that are further likely to be made upon the volume of gas consumed in the field of lighting, have resulted in awakening the people in charge of the gas industry to renewed effort in cheapening the cost of production and distribution, improvement in the quality, and securing to themselves a continued good market for their product.

To secure these ends requires constant study and application on the part of the persons who are charged with the responsibility of securing success for the plant in their care. No opportunity could afford to be wasted, no argument presented but that must be met and successfully combatted.

Somewhere I have read, yet I cannot now give the author nor the source, words that I recollect about as follows: "Humility is all very nice, but don't practice it to the exclusion of the other virtues. A little self-assertion counts for much. We are rated just a little below our own estimate. If you tell the world that you don't count for much, they will take you at your word, saying that you ought to know. He who is silent is forgotten; he who does not advance, falls back; he who stops is overwhelmed, distanced, crushed; he who ceases to grow greater becomes smaller; he who leaves off, gives up. The stationary condition is the beginning of the end; it is the terrible symptom which precedes death. To live is to achieve a perpetual triumph; it is to assert one's self against destruction; it is to will without ceasing, or rather to refresh one's will day by day."

The sentiment expressed in these words is the spirit that must prevail in the minds of those who would succeed in our day, and in no situation will the principle apply better than in the business life of organized gas light companies and that of their servants.

The subject of municipal ownership of gas and electric light companies is now receiving considerable attention at the hands of thinking people, and strong argument is presented by those who favor it, as well as by those who oppose it. While I recognize that each one of us holds strong convictions upon this subject, and appreciates the importance of the question presented, yet I still believe that little good can result by any action on the part of this Association in declaring itself upon the issue. In fact, I think the effect would be otherwise.

We are here as practical men in the gas business, and are in no sense moulders of public opinion, nor are we to consider ourselves as a factor in politics, and, therefore, the less of this outside material we attempt to discuss the better. Our verdict can have no good effect upon the proper authority, and possibly might create friction instead.

The subject of gas for fuel is receiving much attention at the hands of gas light companies in a number of cities and towns throughout our country—special rates for all gas consumed for fuel purposes have been

made, and in a number of situations the rate has been made unusually low. The arguments made in the premises you are all quite familiar with, so that I need not cite any of them; but, from the number of gas light companies that are now making special effort in the fuel field, we ought a year hence, if the results are properly compiled, be enabled to make valuable deductions for the guidance of others who may hereafter elect to make the experiment of furnishing illuminating gas at special low rates for fuel purposes.

The use of gas engines, as a source of motive power in small domestic motors, is not progressing as well as we might wish. The electric motor possesses strong advantages over the gas engine. From the fact of its being a rotary engine, its use can be applied to the upper stories of large buildings. The electric current can be applied to a large number of motors in the same building, applying the power almost direct, thereby saving the amount of power that is usually wasted in long lines of shafting, belting, etc.

The applicability of the use of electric engines to the upper stories of buildings, where the rent charged for the premises is less, and the further fact that where a like amount of power distributed throughout a building with a gas engine as a source of motive power would demand that the engine be placed upon the ground floor, where the rent for premises is much higher, all contribute against the more common use of the gas engine. As an illustration, the ground floor of a building may be very desirable for large offices or for retail business purposes. The rent charged for this floor may be, say, $1,000 per year. The fourth floor of this building may be a very desirable location for light manufacturing purposes, and the rent is only $300 per annum, but it cannot be supplied with power, as no other power is used or demanded in the building. A gas engine will not apply in this situation, but the electric motor will apply perfectly.

The difference in the rent charged for the fourth floor and that of the first or ground floor, will enable the occupant of the fourth floor to pay a premium for the electric power, as he can save more than the premium paid in the charges for rent.

The subject of the World's Fair has received attention at the hands of the American, Western, and also the New England Gas Associations, and has resulted in their appointing a committee from each of those Associations, the committees so appointed to form one general committee. The Ohio Gas Light Association have not as yet appointed a committee to act for them in the general committee above described. I would suggest and heartily recommend that, during the present meeting, a committee be appointed, with instruction to co-operate with the committees of other Associations to represent the Ohio Gas Light Association in the general committee.

I feel I cannot urge too strongly upon you the importance to our industry of securing earnest and active efforts by such committee to the end that the gas appliance part of the exhibition may be entirely creditable and beneficial to the gas apparatus manufacturer, and also to those engaged in the industry of furnishing gas to cities and towns throughout our country.

There is no question but that the electric light industry will be thoroughly represented, if, indeed, it does not prove to be a strong feature of the exhibition.

It would be pleasant, indeed, could I close my address to you this morning without making reference to the death during the past year of a most respected member.

It has pleased the Almighty to remove from our midst one whom we so respected and admired for his many qualities that, of all others, we elected him as being most fit to head the list of honorary members of our Association.

In accordance with our custom, it is fitting that a committee be appointed to draft suitable resolutions of respect to his memory, and that the same be spread upon the records of our Association; and, also, that a copy of the same be forwarded to his family.

Before closing this address, I want to thank you sincerely and heartily for the great honor conferred in electing me to preside over your deliberations at this meeting. It shall be my effort to serve you well, and if I fail, it must be charged to my weakness, not my intent.

I now declare this seventh annual convention of the Ohio Gas Light Association open for the transaction of such business as may properly come before it.

COMMITTEE ON PRESIDENT'S ADDRESS.

On motion of Mr. Graeff, the President's address was referred to a committee of three to take into consideration and report upon the recommendations contained therein. The following committee was named by the Secretary: Geo. W. Graeff, Jr., Fred. R. Persons, Chas. H. Welch.

The Secretary announced that he had received letters of regret from Frederic Egner, St. Louis, Mo.; Richard J. Monks, Boston, Mass.; Eugene Vanderpool, Newark, N. J.; Jas. Somerville, Indianapolis, Ind.; A. B. Slater, Sr., Providence, R. I.; C. F. Prichard, Lynn, Mass.; Henry B. Leach, Taunton, Mass; C. F. Blodget, Brooklyn, N. Y.; Walton Clark, Philadelphia, Pa.; W. H. Denniston, Pittsburg, Pa.; Chas. H. Nettleton, Birmingham, Conn.; A. C. Humphreys, Philadelphia, Pa.; W. H. Pearson, Toronto, Can.; A. M. Norton, Nashua, N. H.; Louis Wagner, Philadelphia, Pa.; A. Hickenlooper, Cincinnati, O.

Telegrams of regret were received from C. H. Evans, Chicago, Ills.; Geo. Shepard Page, New York City and Emerson McMillin, St. Louis, Mo.

READING THE PAPERS.

Mr. H. W. Douglas thereupon read his paper on

THE PROPER HANDLING OF OXIDE OF IRON IN PURIFICATION.

In the purification of gas by dry means, whether by lime or by oxide of iron, these desirable points present themselves:

1st. The gas should remain in contact with the material as long as possible, *i. e.*, as low a velocity as possible should be maintained in the purifiers—only obtainable by a generous area of boxes.

2d. The material should present as great a surface as possible to the gas.

3d. The material should be of such a nature as to give a minimum back pressure.

The accomplishment of these ends in the use of lime was very thoroughly treated by Mr. Forstall, in a paper read before the American Gas Light Association, in 1875, in which he showed that by a treatment of the lime so as to form it into small globules, not only was the back pressure greatly reduced, but a marked increase in the purification per bushel was noticed. In four years the depth of lime was increased from 12 inches to 54 inches, while the pressure was reduced one inch, and the purification efficiency was increased from 7,700 cubic feet to 22,000 cubic feet per bushel.

Were the cost of oxide the only expense, the increased surface and time in contact with material could be obtained by deepening the layer of oxide; but this increases the labor in changing, and does not increase the purification per bushel.

In the use of artificial oxide, made by rusting iron turnings and filings with copperas water, I have had no experience. It is clear that the best results will be obtained when the iron is quite fine, and rusted in the presence of sawdust, so as to deposit oxide of iron on the surface of the sawdust.

In the use of natural oxide the desirable points indicated can be obtained by having the oxide finely powdered, and mixed thoroughly with sawdust while damp. The finer part of the oxide will adhere to the surface of the sawdust, making a larger surface of contact and rendering the whole mass more porous. The sawdust should be quite coarse, and that obtained from soft wood sawed across the grain is most desirable. Should screens be used the proportion of sawdust need only be very small. If the unmixed oxide be put on the screens about 3 inches thick, very good results as regards back pressure can be obtained, and there is, of course, considerable less material to handle. The labor in placing screens will amount to more than the increase of labor in handling a greater bulk of material when sawdust is used.

To illustrate the effect of a varied velocity of the gas in the purifiers, and the evil effects of a high velocity, I have endeavored to collect some data, the results of which are shown in this table. The actual purification per bushel cannot be taken as a basis of comparison without considering the amount of active purifier present; but the ratios of purification at different velocities are perfectly comparable.

Observation.	Size of Boxes.	Daily Output.		Purification per Bushel.		Ratio.	Velocity per Hour per sq. Ft. Purifier Area.		Ratio.
		Maximum.	Minimum.	Maximum.	Minimum.		Maximum.	Minimum.	
1	16′ × 24′	410.0	170.0	966	2,156	2.23	44.4	29.4	2.27
2	20′ × 24′	830.0	375.0	1,700	2,000	1.17	72.4	32.5	2.22
3	20′ × 24′	1500.0	600.0	1,665	4,666	2.80	132.8	52.08	2.53
4	8′ × 10′	36.9	15.1	8.6	11.8	1.37	191.2	78.8	2.42

It will be noticed that the ratios of purification at maximum and minimum are not in proportion with ratios of velocity. A high velocity does not seem to cause a high ratio of purification; No. 2, with a velocity of 72.4 feet per hour, has a ratio of 1.17, and No. 1, with a velocity of 44.4, has a ratio of 2.23.

The following instance illustrates the desirability of a uniform velocity in the purifiers: Two works making water gas are run by the same company, and the same materials are used in both. In one a relief holder has been placed between the generating and purifying apparatus, so that a constant velocity is maintained in the purifiers, and the result is that a purification of 6,000 feet per bushel is obtained, where 4,000 cubic feet is obtained without the holder. The constant velocity with the holder is higher than the mean velocity without.

The revivification of the oxide should be as deliberate as possible. The lid of the box being raised, the box should be allowed to stand as it is some hours. The strongest ammonia gases will thus pass off and render the work of removing the material less uncomfortable.

Should screens be used, it is well to remove the center one in each layer, allowing the air free access to all parts of the box. Oxidation should not be hastened, especially before removal, as too great heat will ensue. Should the heat reach a dangerous point, I can see no harm in throwing on water, as it will only assist in the oxidation. The oxide should be sufficiently dried before replacing, so that it will not cake.

When removed and spread in the air, it should be shoveled up or turned over at least once. Sufficient material to fill at least five boxes is desirable, so that greater time and more complete revivification may be had.

In large works, the labor of changing may be facilitated and cheapened by a system of conveyances and elevators.

Discussion.

The President—You have just heard a very interesting paper read, and its suggestions are now before you for consideration and discussion.

Mr. Christian—I would like to ask if any members have had experience in revivifying oxide when it would not revivify? That is, have any members had a film of oil to form on the iron in such amount as to prevent the iron from revivifying? Sometimes coming out of the boxes black in color, it will not thereafter change its color at all. I would like to know if there is any way in which that film can be gotten rid of, except by taking it out before it gets there? Is there any way that we can get the oil out without injuring the material?

Mr. Douglas—In order to do that we put a layer of sawdust at the bottom. The sawdust will absorb a good deal of it. I do not think there is any way of getting it out after it once gets into the oxide, except to burn it out.

Mr. Christian—If it were washed down pretty thoroughly with water, would it have any effect? I have had a great deal of trouble this winter in purification with oxide of iron, and it has been caused either by the oil or by something that I do not know about. I cannot see the oil on the stuff; it does not show as tar; and yet it will not revive. I wheeled a lot out last January and dumped it in a pile, and the air, snow and rain have acted on it, and it is in splendid looking condition; but when I put it on the floor in a thin layer and turned it over, it would not change its color. After being out doors awhile in the rain, snow and sunlight, it shows a beautiful color; so that I think it can be wheeled back and used over again.

Mr. Hammond—Do you have any difficulty in getting it heated up?

Mr. Christian—Yes, when it is thrown on the floor, and then spread out to the air, it retains its dark color.

Mr. Hammond—I have had difficulty in getting it heated, but have remedied it by sprinkling with copperas water, when, after being used for a short time, it would revivify again all right.

Mr. Hayward—This is my first attendance at your meeting. I represent the Connelly Iron Sponge & Governor Company, of New York. We sell a good deal of oxide for purification, and the only difficulty that we have encountered with it, among engineers and superintendents in handling the oxide, is of the impression which has gone out that air revivifies the oxide, and that it is absolutely necessary to have it spread out very thin. Now, the chemical action takes place thoroughly (as I think Mr. Douglas will agree), when the oxide is heated up; and in order that the chemical action can take place, it must be spread very deep, at least two feet thick, so that from the chemical action taking place, and the air acting upon it, it will heat up to such a degree that the oily vapors accumulated will, to a certain extent, pass away. For that reason, the thinner you spread your oxide for revivifying the worse it will be. Another thing, the oxide should not be put out of doors; it should be kept under cover, and where it is not exposed to the rain. We have found that that is the best way of treating it. A gentleman here spoke of having put it out of doors in a heap. If it was revivified, it was owing to the fact that it was put in a large heap, instead of being spread out thin on the floor.

Mr. Clapp—I think a mistake has been made with regard to the instructions. The instructions, as I understand them, are to spread the sponge out in the same thickness that you have it in the purifier. Is that not correct?

Mr. Hayward—Yes.

Mr. Clapp—Now, if we put it in the purifier to a depth of six inches, according to those instructions we should spread it out on the floor six inches deep in order to revivify.

Mr. Hayward—I will say that usually in giving directions for the use of the oxide, we instruct that the layers in the boxes should be at least a foot and a half thick, instead of six inches; and that agrees with my first statement with regard to spreading it out. Better action is secured in that thickness. It is entirely different from the handling of lime. It i not spread in so many trays in a box. If any instruction of that kind has gone out it was unbeknown to me. I will say that in using the oxide it is of very vital importance that the tar and oily vapors be kept from it. These are very detrimental to it, as all must know who have used it. A thin layer of sawdust should be used on the lower tray, or, if sawdust cannot be procured, we find that coke breeze is very useful for that purpose. If that is not available, spent lime will answer the purpose very nicely. So you see that there are plenty of things that can be used to prevent, or rather to take out, the tar and oily vapors before they reach the oxide. When you have trouble in this respect, do not blame the oxide in purification, but be sure that your scrubbers are all right.

Mr. Christian—I would like to ask if anyone has had experience in blowing air with their gas through the oxide by a steam jet, and in such a way that the steam does not all condense, but is passed out with the air through the oxide. I would like to know if that would have any bad effect on the action of the oxide?

Mr. Thomas—This question came up in the New England Association at its last meeting; but the trouble there was from the back pressure. A number of gentlemen stated that the lower part of the box would be coated quite hard, sometimes half an inch, and often at greater thickness. One speaker who had had a great deal of trouble in his purification, stopped in our office last week, and, in talking over the thing, said he had been using sawdust, but had lately changed to the use of coke. In the bottom of the box he places a layer of small coke, covers it over with bags and lays the oxide on top of the latter. He has been operating in that way for about a month, during which time he has had no trouble with reference to the back pressure. As a matter of course, all the oily substance will thus be kept out of the oxide.

Mr. Bate—I have been using oxide for about four years, running as high as 225,000 feet of gas per day through 8x10 boxes. I use fine breeze on the lower tray, cover that with a lot of bagging, and then above that put two trays of oxide—the lower one being about two feet deep, and the other about 18 inches deep. There is very little space between the first and second tray. We have had no trouble in that time from oil getting into the sponge. We clean out all the breeze about once a month. I am making almost an unlimited use of oxide by putting copperas water on it. We finally have to throw it away, because it becomes too heavy.

Mr. Faux—In my experience in the use of oxide I have had some difficulties. I have lost some through improper treatment. I find the best treatment that I can give the oxide, when it is taken out of the boxes, is to pile it 3½ or 4 feet thick on the floor, and let it lie there until it becomes thoroughly heated—not hot enough to burn, but so hot that you cannot bear your hand on it. Then I spread it out on the floor, less than one feet thick, and during the time it is revivifying I turn it about three times. I have had but little difficulty getting the oily substance out of it. I have used both breeze and sawdust in the first tray. I fill my boxes to the depth of about 28 inches, and I use no tray in the box except one right above the sawdust. I sometimes am troubled when it gets to caking. Then I get scrap tin and burn the tin off, putting in enough scrap tin, and find I have no trouble then in any way. In doing that I get rid of the trays, and have the box filled from the bottom to the top with sponge. I have no trouble with my back pressure.

Mr. Printz—I think I must have misunderstood Mr. Faux. I understood him to say that he placed it 3½ feet deep. Does he mean in the purifying box, or when the oxide is placed on the floor for revivification?

Mr. Faux—The first time we place it on the floor for revivification, it is about 3½ to 4 feet deep.

Mr. Printz—My experience in purification with oxide of iron has not been a very pleasant one. I have endeavored four or five different times to use it, but it has always proved a failure, and we have had to return to the use of lime. I have used the Connelly sponge, and have used other preparations, but they failed with me each time. I have been

given to understand that the failure was because I did not try it long enough; that I must not expect it to do its work the first or second time it was placed in the box. To satisfy myself I was not wrong in that direction, I last year used a material for some three months. I could not afford to use it in all the boxes, because I could not change my purifiers fast enough if I did. I used the oxide in one, lime in the next, and iron in the next; but during those three months we used just as much lime as we did during the same three months of the year before. One advantage we had was that we had to pay a little more for the labor, because we handled the oxide without any benefit. Why I have that trouble I fail to understand. The first time I gave the trial to any preparation of that kind was with Mr. McMillin's preparation of grindstone dust. He came here himself, after I had tried it, and had had trouble with it, and spent three or four days with me—that was during the time he was located at Ironton. He finally gave it up, and found he could not make it answer. I afterwards procured a lot of the Connelly's sponge, and had the same sort of failure. One of the Messrs. Connelly came here, spent three days with me, and was obliged to give it up. Mr. McMillin and Mr. Connelly both came to the conclusion that our boxes were too small; that if we increased the size of the boxes, we would have no trouble—at the time we were using boxes 5x6. We afterwards increased the size to 8x10, but with no greater success. During the last year, four of my purifying boxes have been 10x20. We were only running at that time about 100,000 feet per day. So you see the area of our boxes was away above the average; and yet we had no better success. We have about settled down to the conclusion that it is the coal which causes the trouble; although persons around here are using native coal of the same kind that I am using. I would like very much if I could be put on the track in the right direction for using the oxide of iron. At present we are using lime, and I must say it is pretty expensive. Our purification, for labor and lime alone, runs up to 6 or 7 cents per thousand feet.

Mr. Hammond—I have tried to pass air through the sponge while making gas, but not successfully. I found the difficulty was in getting so much air with the gas that it reduced the illuminating qualities. Our boxes (we use native coal, which has about 4 per cent. of sulphur) are very small, 3 x 3, and require a good deal of changing. To overcome that difficulty, I have attached an ejector by which, when one box becomes foul, I turn off on that, force in the air and steam, revivify it, and then turn it back again. That will revivify about as well as if the sponge had been taken out and put on the floor, and we get good results in that way.

Mr. Welch—I did not understand Mr. Printz to say just what the trouble was. He said he tried the oxide of iron purification repeatedly, but did not say whether the material did not purify enough, whether it took too much of material, or whether it purified imperfectly. I would also like to inquire what material he used.

Mr. Printz—The difficulty was that it failed to take up the impurities. The sulphureted hydrogen would pass over. We are using the native coal which we get here within the city limits. It contains from 3 to 5 per cent. of sulphur.

The Secretary—Mr. Douglas said that if the oxide should reach too high a heat in revivifying, he saw no harm in throwing on water, as it will only assist in oxidation. My teaching has been that that was dangerous, as it has been known on occasions, at least, to stop the process of oxidation, not only at that time but for all time for that material. I would like to ask if he has himself thrown cold water on the hot oxide of iron while revivifying?

Mr. Douglas—I have not, and never had occasion to. I should think it would be necessary to take it out of the boxes as soon as the water had been thrown on it.

Mr. Phillip—I have had some experience with the oxide. Our works are new. We started last May. At the time the works were completed there was no preparation made for a place to properly revivify the oxide, and we had the trouble that the gentlemen speaks of—by the formation of a tarry or oily substance on the bottom of the box. We run three boxes (10 x 10) with oxide, and one box with lime. Our space for revivifying was too small. We could not clean our gas, and we could not clean our oxide. I caused to be erected a porch extending out from the purifying house, 12½ feet by 41 feet. That was made of wood, with sliding glass windows, 5 by 4 feet in size. We put in a brick floor and ran a series of hot pipes around on it, so that in the cold weather of this winter, when throwing the sponge out to revivify, we kept it warm by passing steam through the pipes and getting the brick floor thoroughly heated up. When it gets too hot we shut off the steam until the temperature goes down. So far we have had very good results. I would like to know if any one else has had the same experience in the matter of getting too much heat. I can say very frankly that I am getting the oxide back to its original condition again quicker than I have been able to do in any other way. In pleasant weather, or in weather such as this, we can use that room by sliding the windows back, and when it is too cold, we help it along by steam heating. We put that on the brick floor, from 2 to 2½ feet deep, and turn it every day. In the morning, when the man comes in his business is to turn each batch in order. We have had first rate results so far. Whether I am over the trouble or not, I cannot say. Whether we are likely to meet with bad results hereafter is what I would like to find out. I will say, however, that so far I am doing well. We are getting our sponge in pretty good condition, and putting it back again. As to our lime boxes, the last one is on its third week. It is 10 x 10, with two layers of lime. This coming Saturday that lime will have been in three weeks. We change it once a week, one box at a time; but as soon as one is cleaned out and the other box fouls, we turn right on again.

Mr. Hayward—How much gas are you purifying per bushel?

Mr. Phillip—Our average run is 110,000 per day of 24 hours. We are using all the boxes. As soon as one is cleaned we turn it on again.

Mr. Hayward—How deep are they?

Mr. Phillip—Four feet—we are running two layers of oxide. I think one is 13 or 14 inches, and the other is 12. You will recollect that we had to send you a telegraphic order for sponge. That was caused by the tarry substance forming in two of our boxes at one time, which caused us to be very short of oxide. We telegraphed an order to your firm, and in the meantime we ran on three boxes of lime until we received the oxide from you.

Mr. Douglas—Did I understand Mr. Phillip to say that he changed the purifiers every day, and got 110,000 feet between changes?

Mr. Phillip—No; we do not change the purifiers every day, but that is the yield of gas that we send through the purifiers.

Mr. Douglas—How much do you make between changes?

Mr. Phillip—We are using it all the time. As soon as one box is cleaned, we put it right back again.

Mr. Douglas—How often do you change the boxes?

Mr. Phillip—About once a week, or oftener if a box becomes foul. That is governed a good deal by the coal we use. Some coal has more sulphur in it, and that requires the boxes to be cleaned more often; others will run longer.

Mr. Cline—I would like to ask if any one has had the sponge to take fire when it is heating, and I ask the question because I have a poor place to put my sponge in for oxidization. I put it in the cellar, and I have had some fear of its taking fire. It is in a bad place if that should happen.

Mr. Bate—Once when I left the sponge too long without turning it over it got to a nice, hot glow. After that we were more careful in turning it. We pile it up two or three feet deep, and then turn it over as soon as it throws off a blue smoke, showing signs of heating. We do that eight or ten times a day. I would not recommend the sponge to be left in any place where it could set fire to anything.

Mr. Christian—Will the shavings and copperas burn unless iron filings are put into it—just the plain shaving?

The President—The percentage of iron would determine the degree of oxidation. The more rapidly it oxidizes, the hotter it will get.

Mr. Christian—Can you get it so strong as to set fire to the shavings without putting iron in it?

The President—Yes; we have been using a preparation of iron and sawdust for purification since 1873, and nothing but that, save one tray of lime in each box. I have had some of the experiences related this morning, and among them that of the oxide taking fire. In our earlier experiences we thought if a little iron was good a little more iron was better. We now use about 60 per cent. of iron turnings in the mass. On one occasion a purifier was changed late in the afternoon and its cover raised, and by 9 o'clock the box was on fire. We put it out by lowering the cover and excluding the air. We remedied any difficulty of that kind by adding a material which was a poor non conductor of heat, in the form of very coarse sawdust. Our practice led us to the adoption of a formula for making a material out of very coarse sawdust and iron turnings, in the proportion of about 94 per cent. of the former to 6 per cent. of the latter, by volume, wetting the whole mass down with a saturated solution of sulphate of iron. As Mr. Printz has suggested, it does not do as well at first as it does afterward—at least we did not find it so; but the reason it did not do as well, I imagine, was because the iron was not distributed as well over the surface of the wood. In handling the material we take it out of the purifier on to wheelbarrows, and dump it in a pyramid form—our boxes are 16 by 24, and 3½ feet deep, and the contents of a box will make a pile of oxide of iron

material in the yard possibly 6 feet high and running off at the full angle of repose, and of the proper length to accommodate the quantity. We leave it in that form. If the percentage of iron were in excess, it would heat too hot and char the wood, which would tend to make it too fine and undesirable as a mixture. We put in a percentage of iron sufficient to bring on the heat necessary for ready oxidation when exposed and piled in that form. Mr. Christian said something about introducing steam in the mass, and asked if there was objection to that. I think not. The presence of moisture is desirable, as it assists in the absorption of the sulphureted hydrogen of the gas that passes through. The principal point in the use of iron in purification is ample surface permitting the gas to pass through slowly. I do not think that the oxide of iron acts as rapidly as some kinds of heavy caustic lime.

Mr. Clapp—My experience might do some one good. Having had back pressure with sawdust, I afterwards mixed fine shavings or chips with it, since which time we have had no trouble. Our old boxes were small ones, and since we put in larger ones we have had no trouble at all. If those having back pressure on the boxes will run a lot of pipes around the retort house, they will get rid of it.

Mr. Cline—As our Secretary has had some experience with purifying material I think it would be interesting and profitable to the Association If he would give us the benefit of it.

The Secretary—I do not know exactly what material Mr. Cline refers to.

Mr. Cline—Grinsdtone grit.

The Secretary—That experience we have had in common with many others. With us it has been satisfactory. At Columbus we get it very cheap—only $1.50 for a big wagon load. It revivifies satisfactorily. We have used it without any admixture of sawdust whatever, putting it in just as we receive it. I was a little surprised to see how little back pressure there was. Indeed, I cannot see much difference between its efficiency and that of the material we purchase. We have tried the Douglas mixture and that of the Messrs. Connelly.

On motion of Mr. Cantine, a vote of thanks was passed to Mr. Douglas.

Opening the Question-Box.

The President—Perhaps we can best devote the short time before adjournment to the consideration of some of the questions that have been presented through the question-box. While the list of questions is being distributed I will ask if any gentleman present has had any experience which will enable him to answer the 17th question :

"*What is the best paint for lids of purifying boxes?*"

Mr. Printz—I would take that question not to mean really the top of the lid, but the sides or edges. I can say I have found it best not to use paint at all, but crude oil. We place on top of the water in the channel or canal a layer of oil, probably three quarters of an inch in depth, and occasionally smear a little with a brush around the sides of the lid. We have no trouble with rusting.

The Secretary—I have tried what is known as the Triumph Graphite Grease—a very cheap mixture of grease and graphite—on the rods and girders of the puryfying house roof, which were much exposed to the corrosive vapors rising from the boxes, and rusted very rapidly. Having difficulty in stopping the rusting, I procured and applied the graphite grease, and it has answered very satisfactorily in keeping the rods from rusting. I purpose trying it in the sides of the purifying box lids, and am fully satisfied that it will be very efficient there. I speak of this not by the way of advertisement of the grease, but as a matter of interest and information.

Mr. Cantine—I wish to say I fully coincide with Mr. Printz's statement with regard to painting the sides of purifying lids. I have tried pretty much everything, but never could make anything stick. The water will loosen it. Corrosion underneath the paint will cause the latter to scale off in sheets. I think oil is the best thing to use, as it absolutely prevents corrosion, which is all that is desired. Coating the top of the lid is all a matter of taste. As to painting the iron work, girders, and all that sort of thing, I do not know of anything that is better for the purpose than coal tar and turpentine. It neutralizes the sulphuric acid, and makes just about the hardest substance that you can coat iron with.

The President—The first regular question is—

"*Which is the better method of condensation, 'open air' or 'water'—leaving out of consideration the space occupied and the cost of apparatus?*"

Mr. Thomas—I think air condensation is the best. This process is in a manner like the gas going through the boxes to be purified—the slower the process the better. When tubular condensers were introduced the work was done in a very quick manner, but I do not know that it was done any better. I always contended that the more air condensers one had about the works, the better would the gas be purified. Slow cooling causes the operation to be more complete. Many parties operating works seem to want to get down as quickly as possible to a low temperature. I never liked getting the gas about the works below 60°. In some very old styles of gas works condensing pipes were placed wherever there was a possibility of putting them, and I think the work was done quite as effectually as it is done to day by these complicated condensers. In them the gas passed through a series of pipes surrounded with water, and fresh water came in at the same time to reduce the temperature. I think the slower the process is carried on the more effective it will be, and the better will be the results obtained.

Mr. Harbison—I am not competent to answer the question directly, for I have not had a very large experience in open air condensation, although that was our mode of condensing when I first became connected with the Hartford gas works, a number of years ago. They were then not very extensive, neither was the make of gas; but when we outgrew those works we put in a multitubular condenser. Since that time we have grown still larger and added air condensation, in the form of a large and long take-off pipe in the retort house—a 20-inch main running along the retort house wall. Hence I may be said to believe in both systems of condensation. Our plan works satisfactorily. Our apparatus is quite sufficient. Having put in what I considered sufficent for one million daily capacity, and as our maximum has not been over 625,000, I have no trouble at all in passing the gas slowly through the process of condensation in a very satisfactory way.

Mr. Clapp—This is a meeting in which we can all be benefited by learning the experience of others. I have probably not been in gas works so long as many others here, but I have had the benefit of an experience in four or five different gas works. My experience has been that air condensing is far better than water condensing. I think it is better for the very reason that has been stated—it is slower, is very simple and cheap, and can be effected by running pipes around in such a way as to get all the cocdensation needed. In my experience I have had the best results from air condensation.

Mr. Nash—Will not the naphthaline trouble be less with air condensation than in multitubular condensation?

The President—Will some gentleman kindly answer Mr. Nash's question? Can Mr. Harbison tell us?

Mr. Harbison—Will he kindly tell me what naphthaline is? (Laughter.)

The President—I think that is satire.

Mr. Harbison—I did not mean it to be taken as satire, because it is not so intended. Years ago I did know what naphthaline was, but, as matter of fact, we do not have a particle of it now. We have had none during this entire winter. In fact we have not seen the slightest indication of it about the works or outside of the works, and yet we are still in the business of making gas. I should have said a moment ago, by way of expressing preference as to which is the best method of condensation, that I believe that water condensation is better than air. Of course I speak only from experience in my own location. With us we have at times a variation of 40° in temperature within 24 hours, and if the condensers are exposed to the atmosphere, your condensation will vary very greatly under such conditions. In water condensers you are better able to control it.

The Secretary—At our works we take up the variations in atmospheric temperature by bye passing certain of the condensing apparatus.

Mr. Harbison—That would accomplish the purpose.

The President—I think Mr. Nash's question has hardly been answered.

Mr. Nash—I thought probably a slower method of condensation would tend to reduce the naphthaline.

Mr. Bate—I have used water condensation, and am now using air condensation, principally. I think the use of air condensation prevents the precipitation of naphthaline, as it usually occurs in works.

Mr. Thomas—I have seen, where multitubular condensers were used, the gas, coming from the hydraulic main at 130°, and only traveling a short distance, knocked down to 40°. Such sudden changes tend greatly to produce naphthaline. In most of the original so-called air condensers the pipes were laid underground, so that if the external air temperature did drop 40 or 50°, the temperature in the ground probably would not vary 5°. Down to a certain depth the ground does not vary very much in temperature. In the passage of the gas through the pipe the temperature might be changed, but not to any material extent. As I said before, we never cared to get our gas below 60°. We ran along, as Mr. Harbison has stated to be the case in his works, free of naphthaline, and did not know the why or wherefore. We did not have it when our neighbors were troubled greatly with it. The first experience I had with it was when I put in the multitubular condensers. It would stop up the

four inch pipes in the condenser so frequently that once in two weeks we would have to clear them all out.

The Secretary—How close was the multitubular condenser to the hydraulic main? How hot was the gas before it entered?

Mr. Thomas—The gas issued from the exhauster at about 125°, and entered the condenser at a few degrees less; but I presume it was close to 125° when it entered the condensers. When we put our first standard scrubber in we made the connection to it directly from the exhauster, and the temperature there was generally 125° at one end and 115° at the other. Then it passed through the condenser. We afterwards changed it, running it through the condenser and bringing it back; which ran it down to about 75°. The main thing I think in the manufacture of gas is the slow process of its movement. The more condensers you have and the larger purifying surface, the better will be your results. In speaking about purifiers, some odd sizes have been mentioned here. My idea has always been to have the purifier nearly square, say about 24 feet long and 20 feet wide, and about 4½ feet deep.

The Secretary—My information is that the place where gas can stand sudden reduction in temperature with the greatest impunity is close to the hydraulic main. We have at our works a multitubular condenser placed close to the hydraulic main; and we cool our gas say from 200° to 130° or 140°, at the multitubular condenser, without any formation of naphthaline. Like Mr. Harbison, we do not have naphthaline now.

Mr. Thomas—What is the temperature of your gas at the hydraulic main?

The Secretary—That I do not know, but I think it must be the same at our works as at others. It is certainly very much higher than 130°. Since it emerges from the multitubular condensers at a temperature of 130°, it must have been 300° or 400° close to the hydraulic main.

The President—We are drifting a little from the main question, which is, "Which of the two methods is the better?" and in order to get the sense of the meeting we will take a vote. Many members do not seem disposed to give their experience, hence by taking a vote we can find out which is the better according to the sense of the meeting. Those of the opinion that open air condensation is the better will signify it by standing up, and vice versa. It is decided by vote of 11 to 5 in favor of open air condensation.

Mr. Shelton—Where does the combined system come in on this voting?

The President—We will take a vote on the combined system—that is, the open air and multitubular together. As many as are of the opinion that the combined system is the best will rise. The sense of the meeting seems to be that the combined system is the best. The next question is: "*How can retorts be prevented from getting coated with carbon?*" As the eighth question is related to this, we will discuss the two together. It is—

"*What is the best method of burning carbon from retorts?*"

The Secretary—One fruitful source of the deposit of carbon in retorts is the pressure. If you can remove the gas from the retort as it is generated, so that it will not back up and be at pressure there, the carbon will not deposit as rapidly as if it were under pressure.

Mr. Cantine—The best way to get rid of carbon is not to make it—not to allow it to deposit. I use a rod, ⅝ inch in diameter, put on a spatula, 4 inches in width and 5 or 6 inches long, to remove the carbon. Carbon commences to form in the shape of a moss on the crown of the retort. If you scrape that off at the start you will have no more trouble. Your retort then has become absolutely coated and filled with corbon. The porousness of the retort causes the deposit of carbon. Decomposing it becomes a hard cake, like the cake made from the residuals of petroleum. It is just as easy to prevent its getting there, and very much less trouble, than it is to get the coating off after it once burns on. By putting in the carbon burner you can burn the carbon all off clean, but after the next few charges you make you will get very little gas from the retort. The carbon commences to again form immediately. I have noticed that a retort after being burned out, in two weeks would be as bad as before. I have two benches of fives at work, and have no carbon in any one of the retorts. We have never burned any one of them out. We have never had the carbon burned in them. I grant you that a little carbon will form at the corners right at the back end of the retort, but, by leaving the lids loose for 12 hours, you can easily scale that off and pull it out. There will be two pieces, perhaps 2½ feet in length, and probably four inches in width. I once had a man in the works who was always burning out the retorts, but I never had to do it. I think you will be benefited by that plan. It is a very simple thing to do, and will work as well on retorts without an exhauster as where there is one. You cannot entirely obviate the pressure. You must have some kind of a seal, either of water or tar; and whatever effort it costs to push the gas through that seal will add to your carbon and make so much back pressure.

The President—How long have those 10 retorts been in operation without any deposit of carbon?

Mr. Cantine—Since the 10th of August, when they were put in new.

Mr. Hurlburt—Is Mr. Cantine still working on the retorts where carbon has once formed and been burned off?

Mr. Cantine—Certainly; just as well as with the new ones. You will find a new one just as porous as one which has been burned out.

The President—Mr. Smith, how do you free your retorts of carbon when it has once formed?

Mr. Smith—We burn it off with steam and air.

Mr. Printz—Will Mr. Cantine say how often it is necessary to do this scraping or scurfing; after every charge, or once a week?

Mr. Cantine—After the pores are all filled up, you will hardly find it necessary to do it once a month. In the commencement it will be necessary to do it as fast as it forms. Whenever you see it on the retort, scrape it off; it will not take more than three or four minutes to clean it all off, and it does not hurt the retort a particle to remove it. All the books say you must not use a bar in a retort. I would not use a big one; but this little rod will do no harm. It will not harm the retort in any way.

Mr. Bate—Mr. Cantine remarked that he would let the retort stand for 12 hours. Perhaps he may be able to let one of his retorts stand for 12 hours—although perhaps occasionally he may drop his charges—but we that have to crowd our retorts during the whole time have no opportunity or time to do any scurfing.

Mr. Cantine—That is very true; but our experience is not at all like yours. We are not so crowded. Since the introduction of the electric light we sometimes have time to let one retort stand for awhile. What would you do in the event of your retorts becoming so filled with carbon that you could not use them? Would you not be obliged to stop and clean them out with your carbon burner? Hardly a gas works would have much trouble from this source if the retorts were spared occasionally. Of course this trifling carbon deposit in the back end would not give very much trouble, but if it descended from the crown of the retort, so as to affect the weight of the charge or the placing of the latter, it would be a great obstacle.

Mr. Nash—Will the anti-dip—taking the pressure away by that means—prevent the formation of carbon?

The President—It would somewhat remove the liability; but my experience is heartily in accordance with the opinion expressed by Mr. Cantine. When your retorts are once filled so that there is not any escape of gas through the pores, there is no longer great liability to the deposit of carbon. When the carbon is once deposited in the moss form that Mr. Cantine speaks of, that carbon not being a good conductor of heat, its temperature is lower than the temperature of the retort; hence, when the lid is closed and distillation begins, carbon will deposit on that colder surface rather than flow off. The consequence is that it rapidly builds up, whereas if the moss is kept scraped off the liability to the deposit of carbon is much less. That is clearly evidenced in favor of use of iron over clay retorts in the matter of the deposit of carbon. The next question is:

"*What should be a fair allowance for shrinkage in both coal gas and carbureted water gas, as indicated by difference between station meter and aggregate of consumers' meters?*"

That is, what is a fair allowance for condensation and loss on account of the shrinkage of the gas itself? I have no doubt this question has been a serious one to many of us here, and I would like to have expressions from members on the subject. Can we hear from Mr. McIlhenny?

Mr. McIlhenny—I have been actively out of the business of gas making so long that my opinion is not worth a great deal. I believe in coal gas we hold that about 4 per cent. loss of bulk is due to condensation proper. I would like to have a statement respecting similar loss in water gas.

Mr. Shelton—This question seems to me to come right down to the consideration of what is a fair leakage account. Of course, shrinkage in either case is but a part of the leakage. Comparing coal and water gas in that way, I have recently had occasion to look into the matter in connection with the paper which I shall have the pleasure of presenting to you later on at this meeting, and I have availed myself of some experiments made by Dr. Moore, some six years ago, with a good water gas. I say a good water gas, for the reason that, like everything else, there is good and bad water gas. A great many of the earlier forms of water gas would hardly be called a good gas. It was thought to be, but was not when you applied the test of condensation. In brief, the rea-

son was this: The superheating capacity of those earlier water gas plants was too small to properly fix the constituents of the gas together. Water gas being a mixed gas, made from water and the evaporization of oil, it must be made permanent; and if that is not done you will have trouble, because the oil will separate and condense. I am very sorry to say many of those old forms of apparatus are still in use, and I do not doubt that condensation with them is much greater than in coal gas. Taking the modern water gas, made with the modern apparatus, built on proper plans and in proper proportions, you will find practically no difference. That was shown by Dr. Moore's experiments which I have given in the paper. He found, briefly, that, if anything, when properly made, water gas had a little advantage over coal gas. It is a small fraction. I would like to ask one further question. I did not know it had been determined that 4 per cent. was the amount allowed for shrinkage in coal gas. So many factors come in—such as difference of temperature, leakage proper, and the condensation of different gases due to temperature—that I think it probable the definite amount named is about right for coal gas.

The Secretary—I do not know how Mr. McIlhenny would account for the statement, but the Secretary of our Company (Mr. Lathrop) saw, in a report of English Gas Companies, that some works were rated as having the entire leakage—condensation, leakage and all—as aggregating only 5 per cent.

Mr. McIlhenny—That might be answered in the same way as the showing of some companies in this country—who apparently sell more gas than they make.

The Secretary—Whose meter did they use?

Mr. McIlhenny—The temperature at which it passed through the consumer's meter has been greater than the temperature at which it is delivered at the station meter. That might make some difference. Again, the temperature of the ground in summer time might be such that the gas would pass into the houres expanded. As to my authority for the 4 per cent. loss or absolute shrinkage of bulk in coal gas, I really cannot for the moment say; but I know it is so stated in one of the standard books. I take it for granted that the figure is understood to apply to gases measured at equal temperatures. I have never myself tested it. There is no other question connected with the gas business that the superintendent can address his attention to with the same profit to his company as to the lessening of leakage. Nothing can be worse than to make a thing and waste it. Waste is bad under any circumstances; waste is forbidden in all kinds of economies; and gas *leakage* is a pure waste. A great deal of gas is lost in transit by reason of the insufficient size of the pipes. Some companies have reduced the leakage as low as 5 per cent. That is doing very well. Just think of what your profits would be if all of you could bring your loss down to only 5 per cent. Think how much less coal would cost you, and how much less labor would be required. I do not think there can be any more profitable field for investigation than that of leakage, especially to small companies, where the distance between consumers is great, and so are liable to a larger leakage on that account—perhaps this cannot be helped—but a good deal of it can be lessened with profit, and with pleasure, too.

Mr. Thomas—The case that Mr. McIlhenny instanced where a company sold more gas than it made is one that might be applied with force to some, if their figures are to be accepted. It was said of some companies in the olden times that when they sold only 10 per cent. more gas than they made they changed the superintendent. Of course a fair allowance should be made for shrinkage in both coal and water gas. I cannot say I have ever had any practical experience with water gas, but I think the shrinkage would be about one and the same in both. What ever difference there is is due to a difference in temperature when measuring the gas, and the temperature when the gas is sold. I know of cases where the unaccounted-for gas amounted to 40 per cent.—where they ran their gas out through a double-deck retort to swell it up, and the gas so made was at a very high temperature. If the gas was brought to about the proper temperature—say not over 65°—you will find but very little shrinkage in it. I know this from the fact that we put in a new holder that we hoped to use early in the winter season, but did not get it done until our heaviest consumption was over. We put 300,000 feet of gas in it which remained stored for six weeks; and although it varied every day according to the temperature, yet, taking the volume of gas and rating it with the temperature, there was about the same quantity in the end that there was at the beginning. This same experiment has been tried by another person, within the past six months. This was a case where the pipe conveying the gas ran under a river into the gasholder. The difference in volume made in this way closely approximated to 1 per cent. You will often notice that in cold weather your holders seem to contain less gas than they should hold, but when that gas is distributed the temperature is raised and the volume is brought back accordingly, so you will find very little difference. If you have a seemingly very small quantity, comparatively, in your holder on a cold day, still you are able to supply your consumers—as the temperature is raised by distribution the volume is increased. In addition to the 4 per cent. allowance for unaccounted-for gas, it was calculated there would be 4 or 5 per cent. of loss from the time the gas left the holder until it issued from the consumer's burner. I run gas for several years through over a hundred miles of pipes and yet our entire unaccounted-for gas did not exceed 6 per cent. The fact that many meters are running slow (some ceasing to register at all) will account for a good deal of unaccounted-for gas. I think if the gas is at the proper temperature when put in the holder and when distributed, the difference will be very small—provided the consumers' meters are all right.

Mr. Graeff—I have had frequent occasion to thank this Association for favors in the past, and I would like to thank it once again for demonstrating the fact that there is such a thing as leakage. I think it is a matter worth calling the attention of some gas men to, because, in my unfortunate census experience, I am finding a great many men who not only come up to what Mr. McIlhenny says they do in this country, but who actually do sell every foot of gas they make; that is they make so many feet of gas, and there are just as many feet sold. They not only do not have any leakage account, but it appears that they do not use any gas around their works. Every foot of gas made is sold. I would like it personally very much, if the average gas men could be instructed that as a matter of fact there is such a thing as leakage.

The Association adjourned to 2 P. M.

(To be continued.)

SPECIAL ENGLISH CORRESPONDENCE.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, March 10, 1891.

A Large Gasholder.—Gas Managers Associations.—Introduction of Machinery.—Incandescent Gas Lighting.

The South Metropolitan Gas Company are advertising for tenders for the construction of a gasholder that will, if completed, beat the record in point of size and storage capacity by a long way. I believe the largest gasholder yet constructed, which happens to belong to the enterprising Company just named—being situated at their Greenwich station—is about 256 feet in diameter by 180 feet high, and will contain over 8 million cubic feet of gas; but the new structure is to have six lifts, rising 30 feet each, and the diameter of the outer lift is to be 300 feet. This holder will contain some 12 million cubic feet of gas, and it is to be completed ready for use by Oct. 1, 1892. Mr. George Livesey took considerable interest in the discussions on gasholder guide framing, that occupied the columns of the *Journal of Gas Lighting* to a considerable extent some short time since, but I have not heard whether the new holder is to illustrate in practice any of the new ideas that have lately been put forth in the matter of dispensing with external guide framing, to the displacement of the time-honored columns and girders. It may be mentioned that one or two holders on Gadd's system, in which the structure is guided and supported entirely on the bottom curb, and also some on Pease's wire rope system, consisting of an ingenious arrangement of ropes, so connected that all are kept strained in every position of the holder, have been erected and in practical operation for some months. Sir Humphrey Davy, the leading chemist of the day when gas was first introduced, spoke sneeringly of the use of the dome of St. Paul's Cathedral as a gasholder. One can imagine the surprise of that eminent philosopher if he had been told of a gasholder that would not only take in the dome, but cover the whole breadth and half the length of the Cathedral, while equaling the whole building in cubical capacity.

The New England Association of Gas Engineers, in America, and the Manchester District Institution of Gas Engineers in England, have been celebrating their coming of age, respectively, within a few days of each other. In each case the circumstances are satisfactory, there having been a steady and healthy growth during childhood, and every prospect of entering upon a vigorous period of manhood. In referring to these facts one cannot help thinking of the progress in the gas industry during the last 21 years, and of the growth in ideas respecting the scientific, engineering, mechanical, financial, and commercial departments of gas supply that has been coincident with the development of these Associations. The "Manchester District," though not older than the Gas Institute, is the first of the District Associations in England. It represents a large amount of gas engineering talent gathered together within a comparatively small area, affording opportunity for frequent and fully at-

tended meetings that does not obtain elsewhere. The members take tea together in Manchester, and return to their respective homes the same evening. The geographical element, as influencing the facilities for reaching the place of meeting, must be of great importance to any Association of Gas Managers. But the advantage in this respect is only one amongst other factors that have served to make the Manchester District the foremost Association in England.

Another thought that these two celebrations brings forward, is their effect as pointing a wholesome lesson to those who as yet hold aloof from such Associations, or if they have joined them, only act as contributors of the annual dues towards the funds. With these examples before us it is useless to urge that gas managers' Associations are either unneeded or unimportant. I know a gentleman who has often said that he never went to these meetings because he knew his business as well as anyone else. He has since retired from active labor, and no special catastrophe has befallen the undertaking which he represented. In fact, it is doing better than ever it did before. The best and foremost undertakings in the country are under the care of those who take a prominent interest in our gas manager's Associations, who not only pay their guinea, but are always present at the meetings, and are frequent contributors of papers and participants in the discussions. The converse is also true. The undertakings that appear frequently before the public on account of bad gas, high prices, exorbitant profits, or other financial mismanagement, are just the ones whose directors are noted for the policy of keeping within their shells, and who would, if they could, stop their managers' salary for the time spent in attending an Association meeting. Let such persons follow the careers of the more prominent members, either of the "New England" or of the "Manchester District," and then say if such Associations are not something more than a mere social club, as some would have them to be.

A noticeable feature in English gas works is the rapid introduction of machinery for dealing with the transit of coal and other solid materials. This has obtained for several years in our largest works, in the form of steam cranes for lifting the coal from the vessels, or lines of rails with locomotives for transferring truck loads of material from one place to another. But I now refer more particularly to the introduction of devices for transferring the coal from the store to the retort, without the intervention of shovel or barrow; for taking the coke out of the retort into the coke yard; and for moving the materials in the purifying houses. And this not only at those generally known as large works, but at medium sized establishments making perhaps 100,000,000 to 200,000,000 per annum. Scarcely any extension is now carried out that does not embrace one or other of these modern improvements. One effect of this is that gas managers will have a greater draw on their knowledge of mechanical engineering in the future than they have experienced in the past. They will not only have to be good managers of men, but also good managers of machines. This is partly to be ascribed to the fact that the increasing size of gas undertakings, which gradually opens the door for the introduction of refinements that were formerly thought to be either unnecessary, or "not worth the candle;" but chiefly to the unsettled condition of stokers and various other classes of laborers engaged. The increased cost of coal, together with the objection that is naturally felt against increasing the price of gas, also tends to make directors more enterprising and willing to accept the recommendations of their engineers as to the introduction of any promising improvements. In easy times suggestions of this kind, if not actually dropped out of sight, may rest in abeyance for years.

The subject of incandescent gas lighting has been under the consideration of the Society of Chemical Industry, having been introduced by a paper read by Mr. W. Mackean, the Chemist of the Incandescent Gas Light Company, who gave a great deal of interesting information on the subject. The absolute steadiness, and high duty developed from the gas, have already led most gas engineers to believe that there is something in this form of lighting, which also offers the advantages of being to some extent independent of what we call the quality of the gas. A good incandescent burner, I need scarcely mention, would be a great step in the direction of a cheap fuel gas. In view of future probabilities, any authorative information on the subject is very welcome. Mr. Mackean was in a position to speak upon the results of extensive research into the effect of various ingredients, as used for the construction of the mantle, upon the color of the light produced, its illuminating value, and also the important question of durability. It is known that in this respect the incandescent gas light resembles the incandescent electric lamp. That not only does the mantle become worn out, so to speak, after a certain number of hours usage, but that from the time that it is first used, it begins to deteriorate in lighting effect, getting worse and worse until it is quite used out. How important this deterioration is, may be seen by the fact that in Mr. Mackean's best result a light that started at 23½ candles, went down to 16, or more than 30 per cent., after burning 1,000 hours. Against this it may be remarked that the duty afforded at the end of the period, which was over 6 candles per cubic foot of gas, was very good. But evidently the chief task that the makers of incandescent burners have to solve is to get a fairly regular duty, if only a moderately high one, throughout the life of the appliance. Certain rare metals, or rather their oxides, are used for the manufacture of the mantles, and already the various properties of each element seem to be fairly well understood. Mantles capable of affording either white, yellow, orange, or green colored light can be made, and a light of a slightly yellow tint appears to give the best result in a practical sense. As all students of the emission of light have observed, the color of the light exercises an important effect upon its diffusive or penetrating power, the color just named having the advantage in this respect. The gradual deterioration in respect to the illuminating power was said to be due to the loss (presumably by volatilization) of lanthanum, one of the rare metals employed in the construction of the mantle. So it appears that the secret of a lamp of regular power, would be the use of materials that are absolutely non-volatile under long continued heating. The importance of proper combustion, and of having the flame inside the mantle, was insisted upon. Mr. Mackean has been experimenting with magnesia combs on the Fahnehjelm system, but with only partial success, the chief drawback being the short duration of the comb. In the course of discussion Mr. Scudder stated that the original Fahnehjelm comb, as made in Germany, only gave a duty of 3½ candles per cubic foot of gas used; but he had seen some that were made in America, and gave as much as five candles. He found that the cause of this was due to the fact that the comb, after completion, was dipped in a solution of chromate of potash and then allowed to dry. This treatment also had the effect of rendering the light yellow.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE Greenpoint (L. I.) Chemical Works have taken over the business of the Hill Chemical Company, and will hereafter fill orders for their specialty—iron mass for gas purification. Mr. John Schriever remains Manager of the business. The office and works of the Company are located at Greenpoint avenue and Newtown creek, on the Northeast boundary line of Brooklyn city.

THE Elgin (Ills.) American Gas Company has been granted a renewal of its franchise, to cover a period of 20 years. This favorable action determined the question whether the proposed expenditures on plant shall be made at once, and now we presume that Manager Fitz will have a word or two with gas works contractors. Something like $20,000 will be expended, a large part of which will go into new 6-inch wrought iron mains. The City Council was unanimous in its action on extending the ordinance which speaks well for Mr. Fitz's popularity, who, although he has been in charge at Elgin only since February, 1890, has managed to cut gas rates about 12 per cent. The home company, too, ought to be well satisfied with his efforts on their behalf, as the sendout has been augmented largely by his well directed policy.

SPEAKING of the American Gas Company prompts us to state that General Manager Ramsdell is not identified in any way with the proprietorship of the Ramsdell patents or process for the manufacture of wood gas.

A CORRESPONDENT forwards the following particulars respecting the plant of the Equity Gas Company, of Brooklyn, N. Y.: "The proprietors of the Equity Gas Company, which has the right to supply gas in what is known as the Eastern District, Brooklyn, having demonstrated through the courts the legality of their charter (issued in 1874), have authorized the Equity Gas Works Construction Company to erect their plant, etc., the details of construction to be under the direction of Mr. W. P. Elliott. Some months ago a tract of meadowland, close by Newtown Creek, was purchased, the whole embracing 74 lots, each 125 feet by 25 feet. The property is divided by Maspeth avenue, and runs from Vandervoort to and a trifle beyond Porter avenue. The main building, which will face Maspeth avenue on the south side, will have a frontage of 210 feet, with an L on Porter avenue of 155 feet. The Maspeth avenue front will be flanked by tower gables, 30 feet square, and the buildings will be of brick, trimmed with granite. The roofs are to be of iron, and the floors of concrete. The contracts for the piling (over 4,500 piles will have to be driven), mason work, apparatus, etc., have been let out. The offices of engineer and superintendent (22 by 40 feet) will be in the

tower on Vandevoort avenue, next to which, on Maspeth avenue, comes the purifying house, 112 by 39 feet. Then comes the lime house, 18 by 42½ feet. On the eastern boundary line of main building (corner of Porter avenue) is located the scrubbing and condensing room, 22 by 42½ feet. Directly in line with the latter is the generating house, 66 by 42½ feet, followed by the boiler and engine house, 32 by 42½ feet. All the machinery will be duplicated, and elevators and labor-saving appliances will be availed of wherever possible. It is calculated that the works are to have a per diem capacity of 1,800,000 cubic feet, and a high candle power (25) water gas will be distributed. The 24-inch leading main will run from the holders (these will likely be two in number) to Humboldt street, leading there into three trunk lines (20 inches in diameter), one of which will run from Humboldt street to Bushwick, on to Fairfax street; the second will lead to Union avenue to Broadway, to Fairfax street; the third to Box street, tapping the Greenpoint district. The lateral mains will run from 10 to 4 inches in diameter, and the plotting calls for 108 miles of mains. The proprietors will push the work vigorously, and Mr. Fanshawe will give it close personal attention."

MR. WILLIAM L. FREEMAN, well known in Freehold, N. J., from his long connection with the local gas company, has engaged there in the plumbing business.

LAST week mention was made in the JOURNAL of a discussion over the supposed low candle power of Philadelphia gas, wherefore a certain Mr. Brooke, of that city, paid over to a Pennsylvania charitable institution a sum of money—Mr. Brooke insisted that the candle power was lower now than it had been for 20 years, while his opponent held to the contrary. The official figures respecting the average candle power of the gas for the past 20 years are accordingly appended:

Year.	Candle Power.	Year.	Candle Power.
1871	14.95	1881	16.31
1872	16.36	1882	16.39
1873	16.28	1883	17.16
1874	16.38	1884	17.20
1875	16.61	1885	17.35
1876	16.93	1886	17.29
1877	16.39	1887	17.65
1878	16.19	1888	18.54
1879	16.24	1889	20.07
1880	16.26	1890	19.73

CHRIS. BONN, Chairman of the Lighting Committe, of Burlington, Iowa, has been authorized to obtain tenders for the public lighting of that city. The specifications call for arc lights of 2,000-candle power, and gas lights to be not less than 20-candle power. The bids are to be based on contract terms of 1, 3 and 5 years.

SUPERINTENDENT W. A. ROSS, of the Kenton (Ohio) Gas and Electric Light Company, is a firm believer in the gas end of the business, which is the main dividend reliance on the part of the proprietors.

THE authorities of Marblehead, Mass., will petition the Legislature for the right to operate an electric lighting plant on public account.

THE Ohio Legislature has indorsed the Taylor bill, which makes it a misdemeanor for any "unauthorized person" to tamper with the pipes or fixtures of artificial or natural gas companies.

THOSE interested in the proposed amalgamation of the Kingston (N.Y.) Gas and Electric Light Companies, which was interrupted some time ago by injunction proceedings, have applied to the Legislature for relief. There is no doubt that the appeal will be successful.

UNDER the agreement between the City Council and the Orlando (Fla.) Gas Company, the authorities are to pay $22 per annum for each lamp maintained—moon table—the Company binding itself to put in lamps in any street not now served by its mains, provided 5 lamps are to be maintained over each 1,500 feet of pipe laid.

AT the annual meeting of the Middletown (Conn.) Gas Company the following officers were re-elected: President, A. B. Calef; Secretary and Treasurer, Frederick E. Camp; Superintendent, John H. Jones.

A CHICAGO correspondent, writing under date of March 19, says: "The charter of the Elgin (Ills.) American Gas Company, will expire by limitation on August 2, 1891. It was granted to Amasa Swift and associates, in 1871, and was meant to be quite a privilege, in that it gave to them 'the exclusive right of using the streets, alleys, lanes, etc., * * * for the purpose of laying pipe for the conveyance of gas etc.' It is also interesting to read in the long ordinance granting this franchise that 'in consideration of the privileges granted to the Company they shall furnish to the citizens of the said city gas at the rate of $4.50 per 1,000 cubic feet, until the number of consumers shall reach 150, when the price shall be reduced to $4, and so remain for a term of 5 years.' After that date the price was to be as low as in any Illinois city, except Chicago, within 25 miles of which coal is not mined, for a like quality of coal gas. The new franchise (adopted a few days ago) is a short and modest one. It provides, 'that the privileges granted to the Elgin Gas Light Company be and are hereby extended and continued to the Elgin American Gas Company for a period of 20 years, and it is guaranteed that upon the expiration of the privileges hereby continued the Company or its assigns shall have equal rights and privileges with any other gas company which may be formed for the purpose of supplying said city with gas, provided the privileges hereby granted shall not be taken as exclusive; and provided further, that the rate charged for gas by the said Company shall at no time exceed $1.50, net, per 1,000 feet on all bills paid before the 10th of the month.' Chicago and Elgin parties built the works originally, and they lost a lot of money. Finally, the works were taken by Eastern capitalists who eventually managed to make them self-supporting. They, in turn, sold the plant to the American Company; and now the works are to be remodeled, if not rebuilt.—S."

J. A. PENNEBECKER and wife are suing the Ashland (Wis.) Lighting Company for $25,000, because of injuries sustained by them in a recent gas explosion. They allege that the Company neglected to keep its pipes in repair.

MILWAUKEE, Wis., is noted for two things—its beer, and the fact that so far only one Gas Company has been granted a charter to do business in the city. The German contingent—and other contingents as well—take kindly to the beer, but they seem to be opposed to permitting one Gas Company to retain the field. Possibly, they argue that as the flood of beer has increased with the duplication of the breweries, the flow of gas ought to be more pronounced by the chartering of additional gas companies. Whether or not this is a fair view to take of the situation, it is nevertheless a fact that the German residents of the Second and Ninth Wards are very enthusiastic over the proposition to charter a fuel gas company, of the Hyde Park (Chicago) stripe, and they have "hired halls" for the purpose of giving expression to their feelings in an outspoken manner. The first gathering was held in the Second Ward—the Ninth Ward assemblage we have not yet heard from—and a correspondent forwards the following account of the discussion that was held thereat: "Fifty residents of the Second Ward, and about 10 residents of other wards, met recently in the basement of the Liederkranz Hall to consider the fuel gas question. The meeting was organized by electing Gustav Kaiser, Chairman, and Henry Thiele, Secretary. The Chairman said that the meeting had been called to express disapproval of the action of the Aldermen who had voted against the fuel gas ordinance. He took it for granted that the fuel gas it was proposed to introduce in the city was cheaper than coal, and that the new Company was backed by reliable capitalists. Having finished his speech, the Chairman sat down, whereupon an awkward silence fell upon the assembled burghers. At last a man named Gottschalk took the floor. He said that as the Council would shortly meet to take final action on the fuel gas ordinance, and that as the old Company seemed to be in control of a great many aldermanic votes, if positive action were not taken the old Company might succeed in 'knocking out' its youthful rival. He, therefore, moved the appointment of a committee of three to draft suitable resolutions for speedy presentation to the Alderman of the Second ward. The motion was opposed by Charles Forster, who counseled waiting until the return of the Council Committee from its investigation trip. No one in the meeting, he said, knew anything about water gas, nor could anybody tell whether the new Company would not result in another monopoly, or was not aiming to be bought out by the old Company. He did not wish to condemn the city representatives without a hearing. Mr. Gottschalk replied that the Committee now engaged in investigating gas could not be relied on, as four out of its five members were in favor of the old Company. Chairman Kaiser, from a circular, started out to praise the advantages of the fuel gas, and brought out as a 'strong illustration' the fact that the Council would not have taken cognizance of the protests of one saloonkeeper against issuing a license to another saloonkeeper next door to him. A beardless youth then expatiated upon the rights to which citizens are entitled, and a motion to adopt the Gottschalk motion was put and carried. Chairman Kaiser named Messrs. Gottschalk, Hammond and Forster as the Committee, but Mr. Forster declined to act. He suggested that the Committee be instructed to re-

port immediately after the presentation of the report of the Council Investigating Committee. Leo Hammond sided with Mr. Forster. The Committee of Council, he said, were honorable men, and it would look like presumption for anyone to undertake to censure the Alderman for acts which they have not yet performed. Perhaps the new Company was merely an imposition, or a scheme to squeeze money out of the old Company. Perhaps the new gas was of no use, which he, personally by-the-way, knew to be a fact. A water gas plant had been established at Appleton, Wis., but it was a complete failure. Robert Schilling was called upon for a speech, and that worthy who never loses an opportunity to pose as a know-all, 'went at the matter before the house' in his usual impetuous, noisy manner. He urged those present to join in a general movement in favor of the city establishing its own works. The new Company would ultimately branch out into another monopoly, and the people would have 'to fight two dogs;' whereas if the city took hold of the gas business the price of gas per 1,000 would be 10 cents, and millions would annually be saved to the citizens of Milwaukee. He styled the old Milwaukee Gas Light Company an 'infernal, robbing monopoly,' which was defrauding the citizens. He referred sarcastically to Superintendent Cowdery accompanying the Investigating Committee on their trip, and indulged in much more that was ridiculous. Finally, the meeting adjourned, the Committee receiving instructions to report at the call of the Chair."

JAMES B. QUINN, General Manager of the United States Gas Consumers' Protective Association, of Chicago, Ills., was in Milwaukee a week or so ago, testing the meters of gas consumers, on account of or at the request of the latter.

THE practice of the Zanesville (O.) Gas Company is to replace worn out gas burners with new ones without charge to the consumer. Gas stoves are also placed on trial for a reasonable period without charge.

FROM a recent letter issued by the proprietors of the Westinghouse Machine Company we make the following extracts: "For several months past the daily press has constantly referred to what is called the financial troubles of the Westinghouse interests. While it is true that there are several industrial corporations which in one form or another bear the name of Westinghouse, it is equally true that the financial troubles among these companies have been confined to what is known as the Westinghouse Electric and Manufacturing Company: or, in other words, to that Company whose business consists in making and vending electrical apparatus. The Westinghouse Machine Company, for instance, whose business consists in making and selling, through the medium of its agents the world over, its well-known Westinghouse engines has had no financial trouble, and, to use a current expression, 'is not in it.' Instead of curtailing its operations, this old, reliable institution is still further increasing its capacity as rapidly and as much as it can. New tool and storerooms are just approaching completion, and it is hoped by the management, during this spring or summer, to be able to add complete new erecting and testing shops, fitted with large power cranes and all modern improvements, and which shops will have a producing capacity twice as great as the present ones."

A PETITION has been made for the appointment of a receiver for the Iowa City (Ia.) Gas Company.

THE Port Huron (Mich.) Gas Company will enlarge its plant. The Company is gaining ground rapidly.

A PROMINENT candidate for the Directorship of the Philadelphia Public Works Department is William D. Gardner, an ex-President of the old Gas Trust.

FROM the annual report of Mr. C. W. Hinman, the Massachusetts gas and gas meter inspector, the following interesting matter is gleaned: In the twelvemonth 18,205 meters were inspected, of which 17,984 were either new or recently repaired meters, which large number was chiefly due to the action of the Boston Company in repairing a high percentage of its meters in service. On the complaint of either the consumers or companies 221 meters were tested. Of these 64 were fast, with an average error of 5.32 per cent.; 134 were within the legal limits—2 per cent. either way; 20 were slow, with an average error of 23.60 per cent.; and 3 did not register at all. The average error of all was .60 per cent. slow—making no note, however, in the average of the meters that failed to register at all. The general average last year (218 were tested) was .05 per cent. slow. The Inspector calls attention to the fact that of the meters brought to the office under suspicion in late years about 60 per cent. are correct. Of the incorrect meters, 70 per cent. are fast and 30 per cent. are slow, but the slow meters on the average are more than twice as much in error as the fast meters. Having noted the conditions under which consumers may have their meters tested by the State, and calling attention to the imperfect method usually followed by itinerant meter inspectors, as well as to the overcharges made for inspections by such persons, the Inspector passes on to the matter of testing for candle power and purity. He introduces these topics by mentioning the apparatus employed and the method of testing followed. During the year, 436 separate inspections were taken at works where coal gas or a mixture of coal and water gas was made, Boston having been visited 52 times; Lowell, 35; Roxbury, 26; Worcester, 20; Cambridge, 20; Springfield, 12; and so on. The grand average candle power was shown to be 17.83. The average content of sulphur, in grains per 100 cubic feet, is returned at 10.13, and the ammonia content is reported at (average) 10.13 grs. Of the oil gas companies 18 inspections were made, Stoughton gas showing the highest (52.80), candle power, that at Southbridge being 23 candles. The average for all inspections made of the oil companies was 39.04. The candle power of the companies over the State shows an increase over the previous year. The Inspector finds that the companies sending out a mixed gas (coal and water), in which coal gas forms the larger portion of the mixture, are subject to great fluctuations in candle power, the difference between the highest and lowest values averaging 3½ candles. Several companies were delinquent in respect to excess of impurities—sulphur, sulphureted hydrogen, and ammonia—over the statute provisions, but the reason given is the inferior nature of the coals that many of the companies were obliged to carbonize because of the labor troubles at the mines in the standard gas coal regions. The Inspector concludes his report by submitting no less than 20 eudiometric analyses of mixed gases distributed at 13 different points in the State (the duplicates are from Dorchester, Boston, Fall River and Cottage City), but as these are of sufficient value and importance to be given in full, they will be so reprinted in a future issue; as also will be his remarks or comments in the matter of the good policy of changing the statute regulations regarding the test burner for estimating the lighting value of Massachusetts gas. Taken all-in-all, the document is a very interesting one, and the clearness and precision with which its matter is set forth are new evidences of the careful methods that actuate Mr. Hinman in carrying on the duties of his place and office.

THE premises and plant of the Hamilton (Ont.) Electric Light Company are to be sold at auction, without reserve, on April 15th. The sale is ordered by the Canada Permanent Loan and Savings Company, which holds mortages on the plant in the sum of $148,000.

THE Kingston (Canada) Gas Light Company will increase its capital stock to $250,000, in order to provide for payments necessitated by its recent absorption of the Kingston Electric Light Company.

THE Tennessee Legislature has passed the bill under which Pulaski asked for powers to purchase and operate an electric light or gas plant.

THE number of gas consumers in Philadelphia is 134,555, who maintain 2,328,986 separate gas burners. The public gas lamps, number 18,984. The authorities complain that "the increase in the quantity of gas used by the several city departments, and for which neither credit nor money passes to the Bureau of Gas, continues with unabated rapidity, and now amounts to as much as the total private consumption of 1864. The number of broken lamps reaches such startling figures that more stringent measures should be adopted by the proper authorities to make the breaking of a lamp too expensive for every day indulgence. The total number of lamps under the care of the Bureau of Lighting, so far as repairs are concerned, is 18,984, and the report of the Chief of the Bureau shows that 42,453 broken glasses were replaced, more than 2¼ breakages to each lamp. The sum paid for electric arc lights last year was $201,259.29, nearly two-fifths of the total expenditure for lighting. These figures are growing so rapidly, that the question of the establishment by the city of electric lighting stations is becoming one of pressing moment. In the previous reports from this department this question was fully argued, and nothing has occurred during the past year to change the conclusions then expressed. The city should do the work of electric lighting, without the intervention of private corporations. The public highways, under and above ground, are granted to these companies, enabling them to compete with the city in furnishing gas to the general public, to the immediate loss to the City Treasury. To aid them in doing this the city then pays them over $200,000—surely bad financial management, benefiting no one except the stockholders of these companies."

THE AMERICAN GAS LIGHT JOURNAL

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PROPRIETORS.

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MONDAY, MARCH 30, 1891.

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16 WALL ST., NEW YORK CITY.

MARCH 30.

☞ All communications will receive particular attention.
☞ The following quotations are based on the par value of $100 per share.

	Capital.	Par.	Bid	Asked
Consolidated	$35,430,000	100	95½	97
Central	500,000	50	90	100
" Scrip	220,000	—	95	100
Equitable	4,000,000	100	116	118
" Bonds	1,000,000	—	113	115
Harlem, Bonds	170,000	—	—	—
Metropolitan, Bonds	658,000	—	110	115
Mutual	3,500,000	100	119	120
" Bonds	1,500,000	—	100	102
Municipal, Bonds	750,000		—	—
Northern		50	—	—
" Bonds	150,000	—	—	100
Standard Gas Co—				
Common Stock	5,000,000	100	—	48
Preferred	5,000,000	100	—	90
Yonkers		50	112	—
Richmond Co., S. I.	346,000	50	—	—
" Bonds	20,000	—	—	—
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	117	120
Citizens	1,200,000	20	88	91
" S. F. Bonds	320,000	1000	100	103
Fulton Municipal	3,000,000	100	130	132
" Bonds	300,000		100	105
Peoples	1,000,000	10	88	90
" Bonds (7's)	368,000	—	100	—
" " (6's)	94,000	—	100	—
Metropolitan	870,000	100	100	105
" Bonds (5's)	70,000	—	—	—
Nassau	1,000,000	25	134	—
" Ctfs	700,000	1000	100	103
Williamsburgh	1,000,000	50	130	—
" Bonds	1,000,000	—	108	112
Out of Town Gas Companies.				
Boston United Gas Co.—				
1st Series S.F. Trust	7,000,000	1000	—	87¼
2d " " "	3,000,000	1000	74½	76
Bay State Gas Co.—				
Stock	5,000,000	50	54½	55
Income Bonds	2,000,000	1000	95½	—
Buffalo Mutual, N. Y.	750,000	100	105	110
" Bonds	200,000	1000	95	100
Citizens, Newark	1,000,000	50	155	160
" " Bonds	45,000	—	—	—
Chicago Gas Company	25,000,000	100	43¼	44¼
Chicago Gas Light & Coke Co.—				
G't'd Gold Bonds	7,650,000	1000	84¾	85½
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1000	—	98
People's Gas and Coke Co., Chicago—				
1st Mortgage	2,100,000	1000	—	100
2d "	2,500,000	1000	94	98½
Consumers Gas Light Co., Jersey City	2,000,000	100	12	15
Bonds	600,000	1000	70	75
Cincinnati G. & C. Co.	6,500,000	100	204	205
Consumers Toronto	1,000,000	50	190	200
Central, S. F., Cal			92	100
Capital, Sacramento, Cal			58	
Consolidated, Balt	11,000,000	100	47¼	48
" Bonds	6,400,000		107	107½
Citizens Gas Lt. Co., Rochester, N. Y.	500,000	—	85	110
Bonds	250,000		—	—
East River Gas Co., Long Island City	1,000,000	100	100	105
Bonds	500,000	100	100	102
Hartford, Conn	750,000	25	102	108
Jersey City	750,000	20	165	170
Louisville, Ky	2,570,000	50	125	130
Little Falls, N. Y.	50,000	100	—	100
" Bonds	25,000	—	100	103
Laclede Gas Light Co., St. Louis, Mo.—				
Common Stock	7,500,000	100	15½	16½
Preferred "	2,500,000	100	46	51
Bonds	9,034,400	1000	77¾	78
Montreal, Canada	2,000,000	100	200	208
Memphis (Tenn.) Gas	750,000	100	40	—
" Bonds	240,000	100	103	—
New Haven, Conn		25	200	—
Oakland, Cal			34½	35½
Peoples, Jersey City		—	60	61
" " Bonds			—	—
Paterson, N. J		25	99	102

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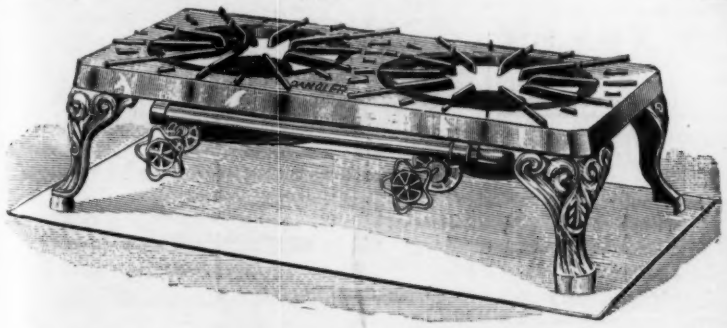

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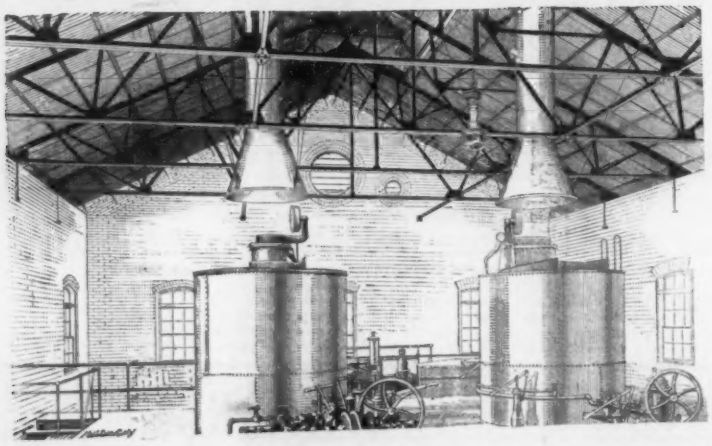

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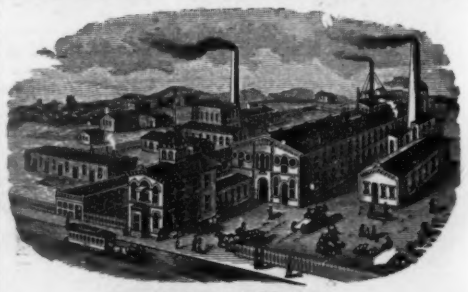

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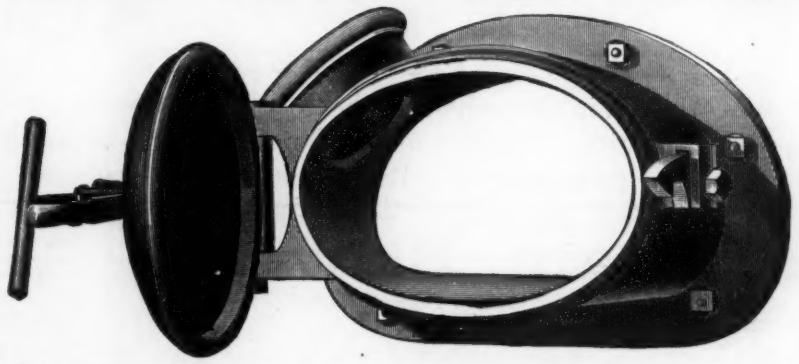

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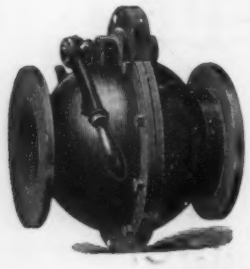

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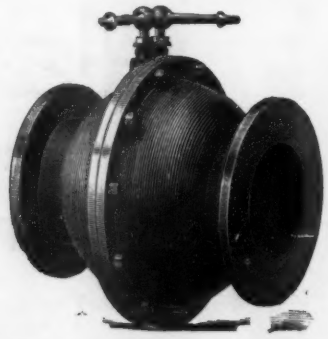

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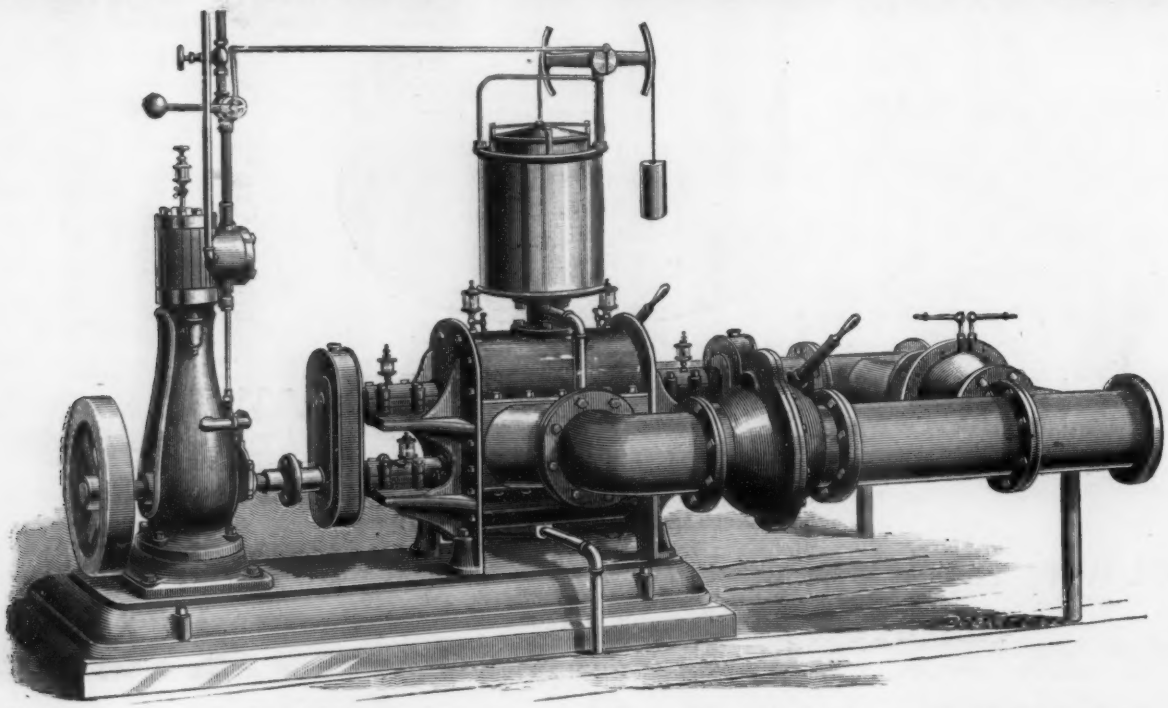

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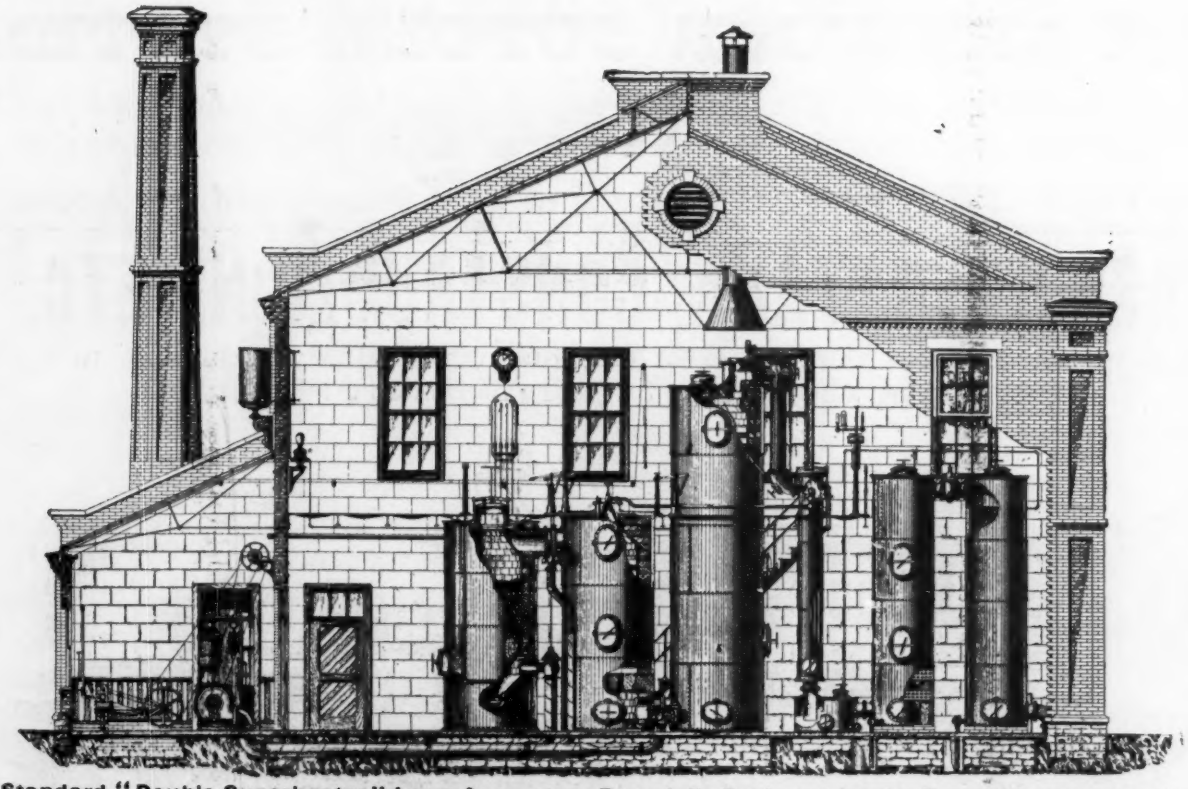

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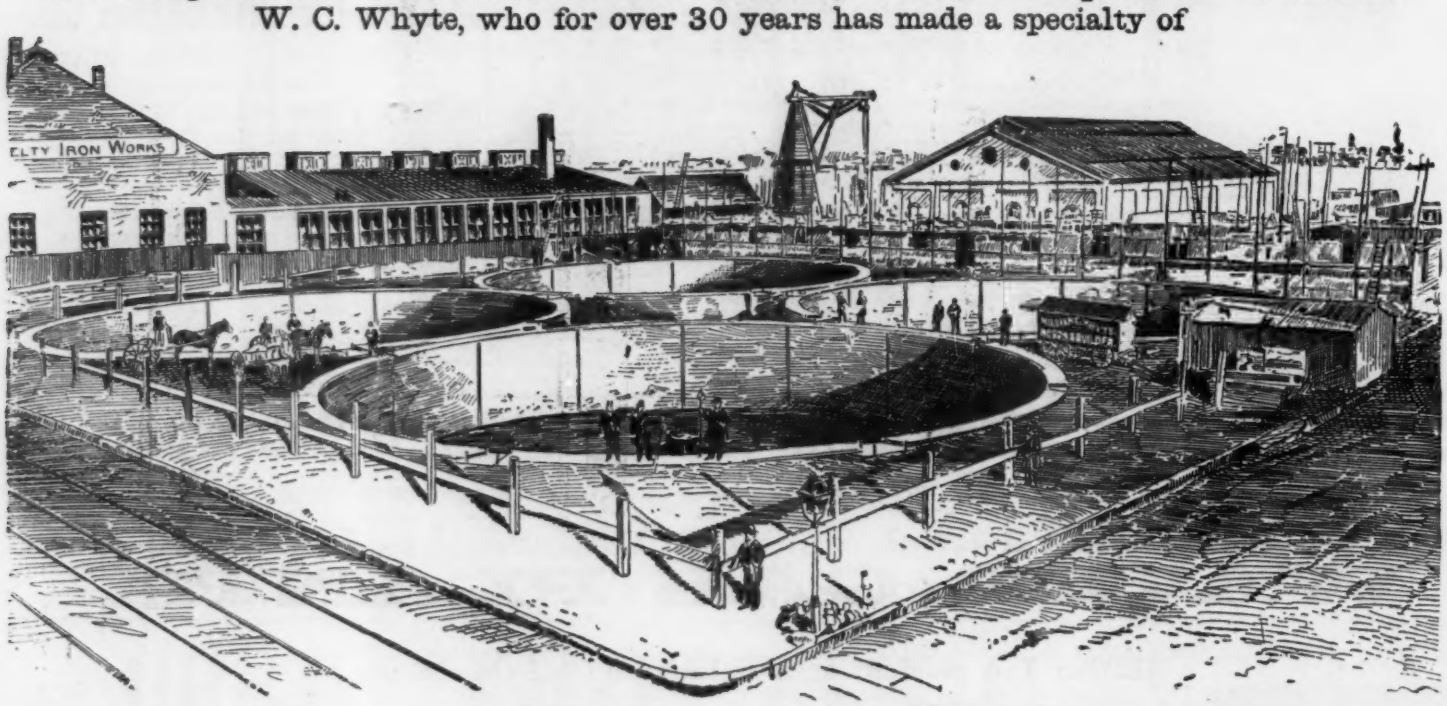

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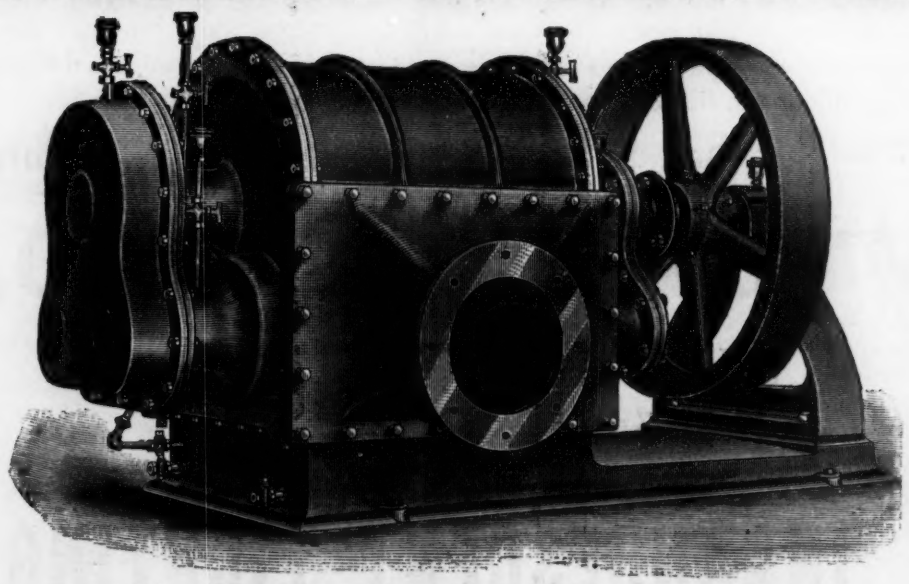

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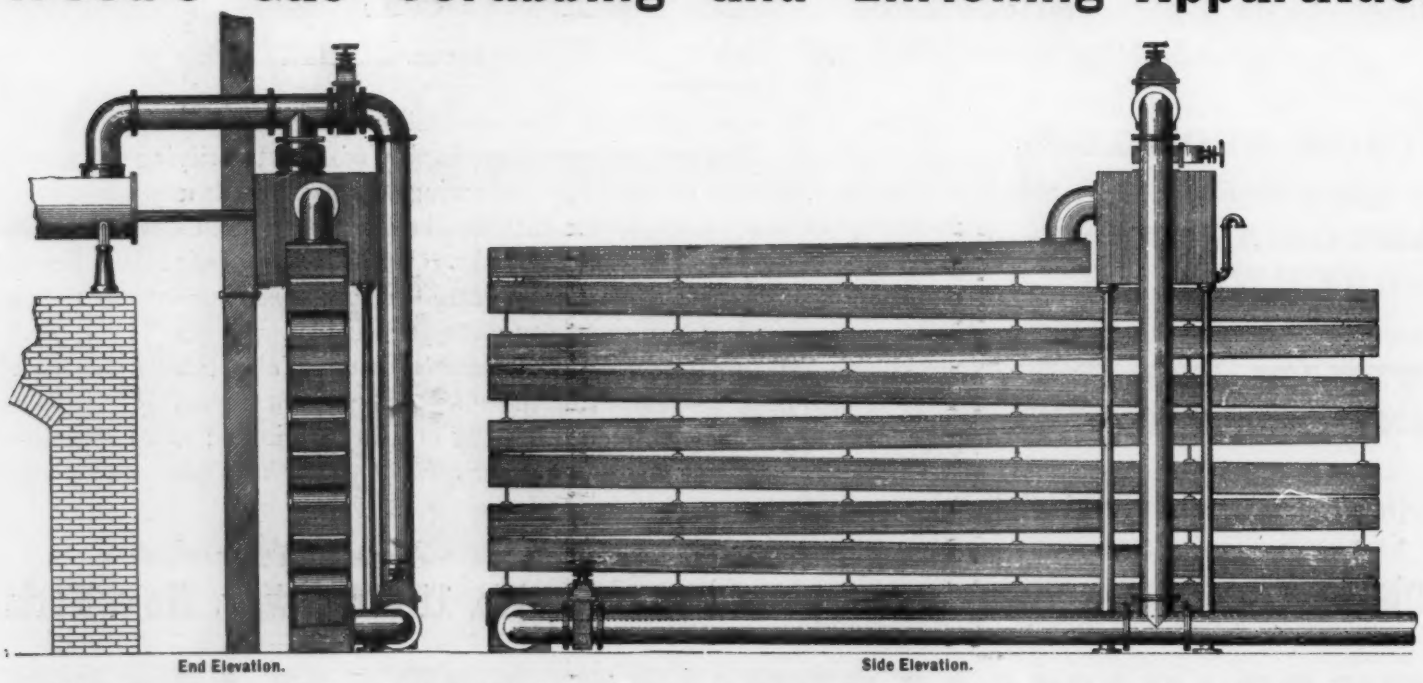

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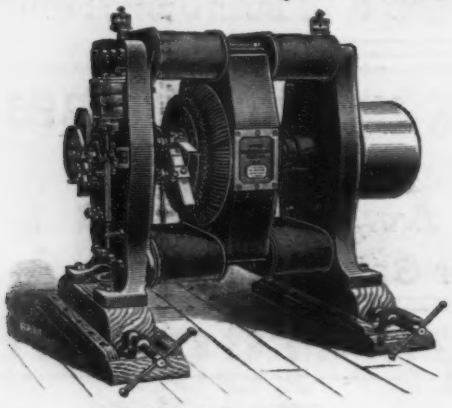

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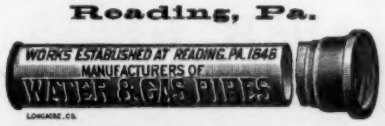

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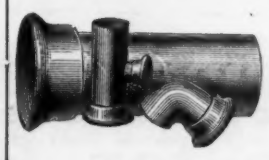

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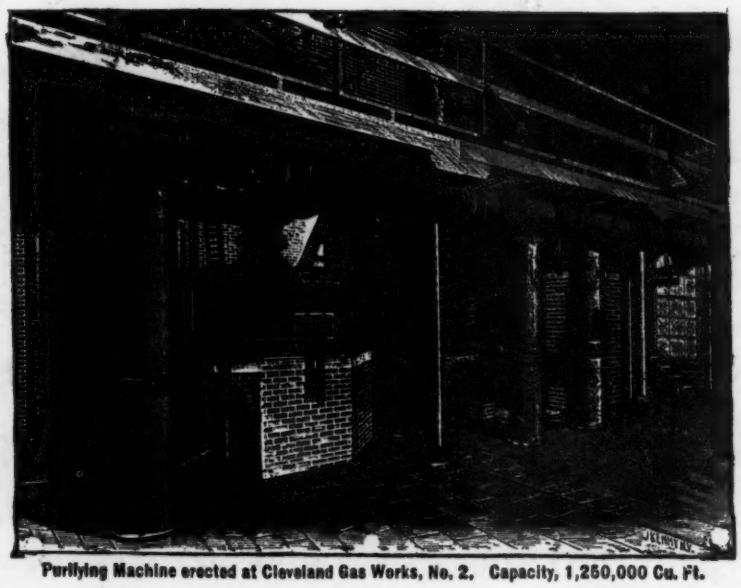

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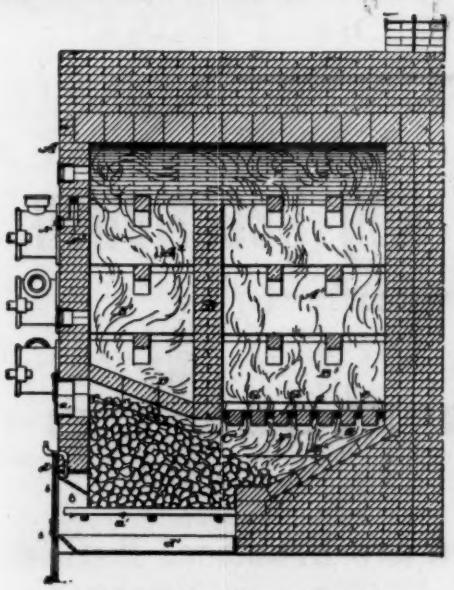

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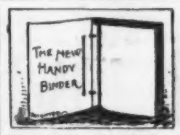

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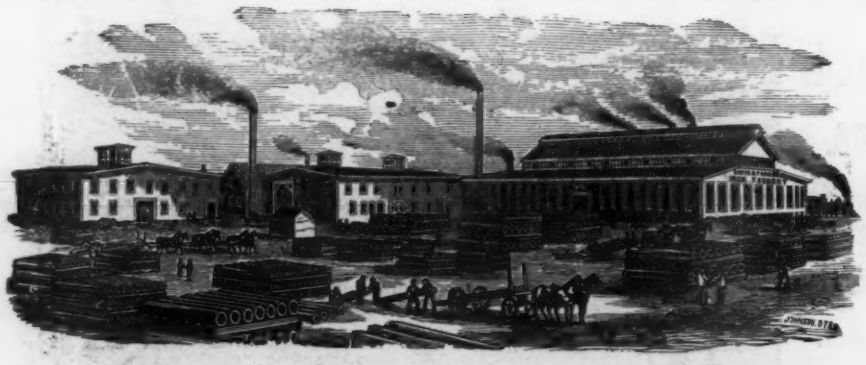

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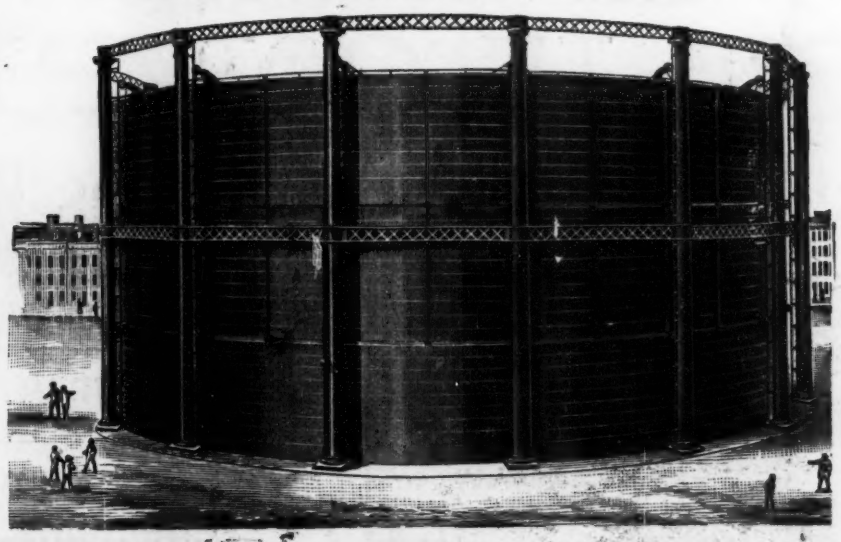

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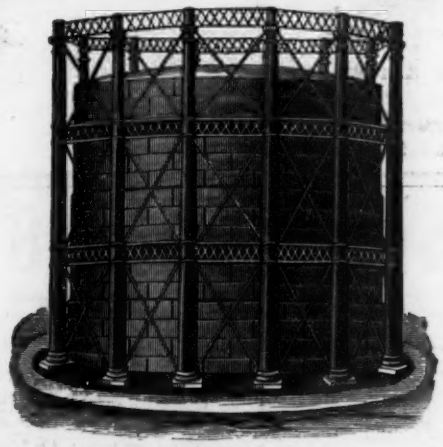

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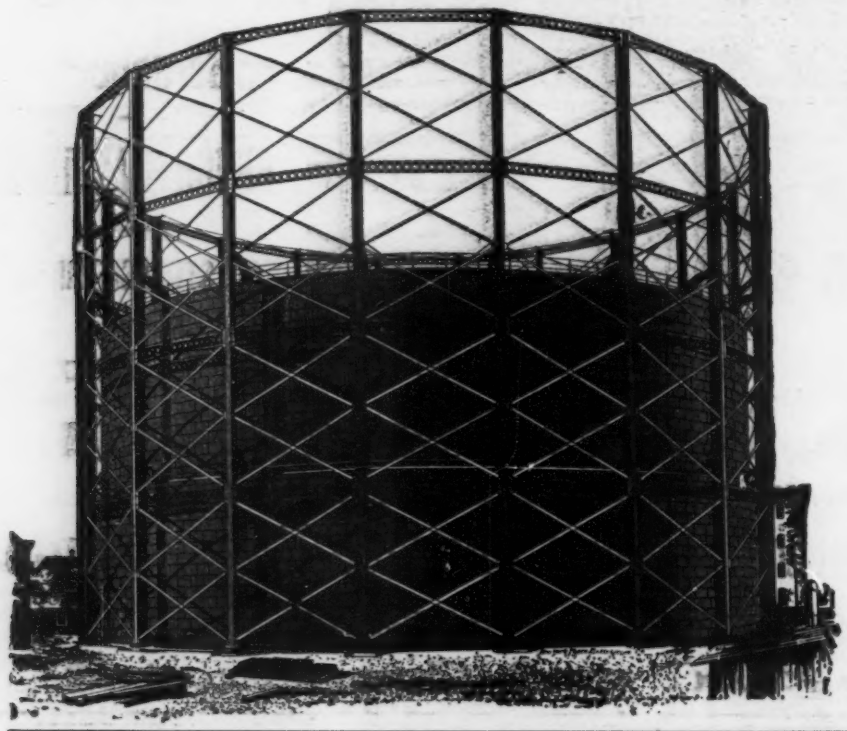

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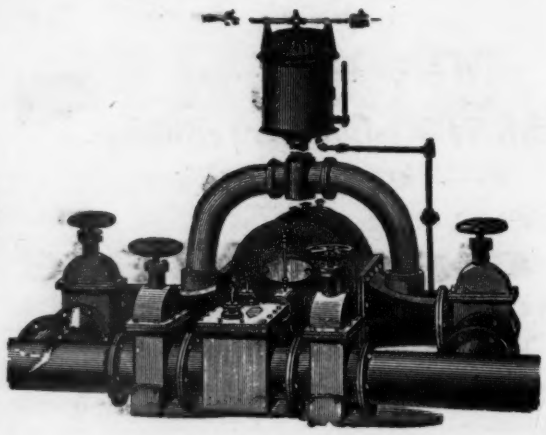

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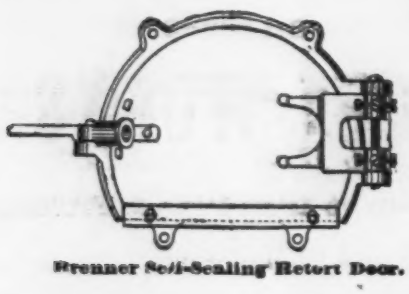

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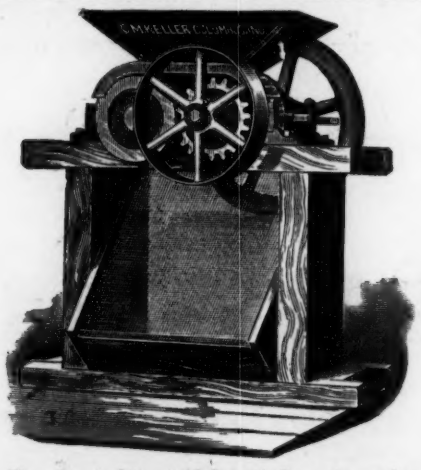

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The Most Economical, Efficient, and Durable Gas Stove Made.

GAS COOKING STOVE, No. 8 C.

SIZE.

Stove.	Oven.	Roaster.	Top.	Length over Extension Shelves,
37 in. high.	12 in. high.	12 in. high.	24 in. long.	36 in.
20 in. wide.	17½ in. wide.	18 in. wide.	21 in. wide.	
	12 in. deep.	13 in. deep.		

This Stove has four burners on top, and double oven burner.

Consumption of gas with all burners in use, 42 feet per hour, at 1 inch pressure.

The top is made in sections, so that a greater variety of cooking utensils may be used. By lifting out the covers and crosspieces and putting in a suitable forked ring, which is sent with each stove, a wash boiler or other large utensil may be set over two burners. Our **No. 87 GRIDDLE** also fits in the same position. The roasting oven is provided with a cast iron door.

All Fittings are Nickel-Plated.

GAS COOKING STOVE, No. 7 B.

SIZE.

Stove.	Oven.	Roaster.	Top.	Length over Extension Shelves,
31 in. high.	9½ in. high.	10 in. high.	21 in. long.	32 in.
17 in. wide.	14½ in. wide.	15 in. wide.	16 in. wide.	
	12 in. deep.	13 in. deep		

This Stove has three boiling burners in the Top or Hot Plate, and one single oven burner.

This cut represents our New Style Cooking Stove. As will be seen, it has an ornamented cast-iron Base and Front, and extension shelves. The Oven Burner, which is atmospheric (unless otherwise ordered), is of an entirely new and improved pattern (patent). The ovens are of greater capacity than those of the old style. The Top, in conjunction with the Outlet Pipe, is designed to carry off all the products of combustion, if desired, but they are also supplied with a loose ring which converts it into an ordinary open top stove.

The consumption of this Stove is 35 cubic feet per hour at 1 inch pressure, with all Burners in use.

All Fittings are Nickel-Plated.

"RADIANT" BOILING STOVE, WITH REGENERATIVE BURNER.

Size, 6½ inches diameter, 8 inches high. Consumption, 6 feet per hour at 1 in. pressure.

HOT PLATE, No. 111.

Size, 36 in. long, 12 in. wide, with three double burners, 6 taps.

Consumption, with all burners in use, 36 cubic feet per hour, with 1 in. pressure.

¾ in. supply pipe should be used where the pressure is 1 in. or over.